

# COMPUTERWORLD

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## IS, sludge and the politics of pollution

*Systems built under intense public pressure*

BY ALAN J. RYAN  
CW STAFF

BOSTON — The winter wind whips across the fouled Boston Harbor and into the historic Charlestown Navy Yard. Yet systems workers at the Massachusetts Water Resources Authority have little time to ponder the air currents. A year ago, they had no applications. Today, they have 12. Within the next 19 months, they must add 20 more.

That systems challenge, however, is all the more Herculean a task thanks to the political muck in which the MWRA has found itself consistently mired. With the federal government threatening to sue over harbor pollution, local politicians debating where the

MWRA will dump sludge and the man on the street screaming over skyrocketing water and sewage bills, the MWRA has been under regular siege.

Unlikely as it may seem, finding seasoned information systems workers who will brave the political sludge has not been a problem. For them, the intense timetable is an attractive challenge.



MWRA's Earley  
cleaning up harbor

The application modules being put in place at the MWRA are among tools to help Boston clean up the harbor through a new

\$6.1 billion wastewater treatment facility and help the city and surrounding communities use water supplies more efficiently. Other systems will handle accounting and administrative functions for

*Continued on page 116*

## VDT forces unfazed by setbacks in N.Y.

BY ELLIS BOOKER  
CW STAFF

PATCHOGUE, N.Y. — Concerns over the alleged health effects of VDTs are spawning dozens of efforts at the state level to establish guidelines regulating their purchase and use.

What had been called the nation's toughest law regulating worker exposure to VDTs was overturned at the eleventh hour late last month by a state supreme court because of a jurisdictional technicality.

Just one day earlier, outgoing New York Mayor Edward Koch vetoed a proposed VDT law for municipal workers that had been unanimously passed by the city council. Wisconsin is also considering a controversial bill that would require workers to spend no more than 50% of their day in front of VDTs.

Proponents of VDT guidelines pointed to studies that associate VDT exposure with miscarriages, vision complaints and repetitive strain injuries such as carpal tunnel syndrome. Opponents to such rules said medical evidence is inconclusive and that

many companies have already instituted training programs on the safe operation of VDTs.

To date, however, only Maine and Rhode Island have passed laws affecting both the private and public sectors (see chart page 12).

In Maine, a law that took effect in July 1989 calls for every employer in the state with more than 25 terminals at one location to establish a training program for workers who operate a terminal for more than four consecutive hours on a daily basis. Training emphasizes the proper use of VDTs and techniques to minimize VDT-related ailments, such as the importance of proper

*Continued on page 12*

## GE buys into Netview/PC with IBM help

BY ELISABETH HORWITT  
CW STAFF

While a number of Fortune 500 companies have pronounced IBM's Netview/PC expensive, limited and generally unfit for user consumption, General Electric Co. recently chose it as the basis for an integrated network management system that also uses host Netview, IBM confirmed.

GE already uses Netview to manage each of its 30-plus data centers. However, Netview/PC — specifically, the OS/2 version of the product that began shipping last May — will provide the essential two-way interaction between GE's Netview-based control center and a hybrid, multivendor transmission network that connects the company's sites worldwide, according to Leonard Dorian, GE's manager of telecommunications operations. "I think we're on the edge of attaining what IBM intended to use [Netview and Netview/PC] for," Dorian added.

The catch, however, was that GE could not develop such a system on its own but rather had to

*Continued on page 8*

### IN THIS ISSUE



*Computerworld* kicks off a weekly feature devoted to technologies that are coming out of the labs and into use. This week the Advanced Technology section looks at biometric security. Page 16.

## Lottery agents hit jackpot, courtesy of systems glitch

BY RICHARD PASTORE  
CW STAFF

DOVER, Del. — It sounds like a cockeyed criminal caper from an old *Batman* television episode: A computer-based state lottery system goes berserk, allowing unscrupulous lottery agents to help themselves to \$555,000 in winning tickets after the numbers have already been drawn.

But the culprit behind this recent Delaware lottery snafu was no Joker — it turned out to be a jammed printer at the Control Data Corp. computer center that runs the lottery system from Harrisburg, Pa.

Instead of shutting down as usual just prior to the daily num-

ber drawing on Dec. 21, Delaware's 265 lottery-ticket terminals stayed on-line as the winning numbers popped up on television screens across the state.

The result was a brief free-for-all, as clerks on duty at ticket outlets punched up about 465 winning tickets.

Seven minutes after the drawing was over, a CDC staffer realized the Delaware terminals had remained live and traced the problem to a jammed printer.

Apparently, backed-up printer jobs had clogged a memory buffer used by the main system to update the lottery terminals' clocks. With the buffer out of commission, the terminal

*Continued on page 6*





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## Quotable

**"Once you have dismantled your IS infrastructure completely, you have no capabilities left."**

DUDLEY COOKE  
EXECUTIVE INSIGHT

*On the need to keep an IS structure, even during an outsourcing move. See story page 67.*

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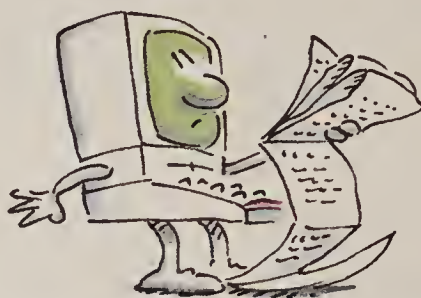
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## UPDATE

**O**n the list of items that provoke anxiety — marriage, divorce, taxes, etc. — getting fired has always been near the top. But those whose employment has been "involuntarily terminated" can take heart. A national survey by Accountemps of personnel directors at Fortune 1,000 firms has found that fired workers are likely to become better and more valued employees in the future. In fact, two out of three of the experts polled said people actually derive *substantial* benefits from being fired. You wonder which people they had in mind. Oh well, when that pink slip hits your desk, just say "cheese."



*An easy way to sort out 1989 Computer-world feature articles. Page 81.*

*Outsourcing is nothing new to Kinney Wall Coverings' Bill Jonopulos. Page 67.*



ED KASHI

# EXECUTIVE BRIEFING

■ **Outsourcing can work and work well** if handled properly. For some firms, handing over all or part of their IS functions does seem to yield both cost savings and efficiency improvements. It is no cure-all, however, and may be the worst possible medicine for problems resulting from ineffective management. In fact, some experts and users contend that outsourcing, in the long term, cannot beat a well-run internal operation. **Page 67.**

■ **General Electric has developed** an integrated multivendor network management system based on both IBM's Netview and its controversial Netview/PC using OS/2. The system, however, required a year of customization by IBM technicians under contract to GE. Unlike other very large users who have developed their own links into Netview, GE chose to work closely with the vendor, giving it a head start on some IBM network management technology that is not commercially available. **Page 1.**

■ **Starting salaries for IS professionals** will increase by about 5% in 1990, according to a recent Robert Half study. The starting salary range for IS directors is predicted to rise 4.8%, while senior project managers will get the largest increase, 7.3%. **Page 55.**

■ **The debate over VDT safety** is shifting to the state level after two local VDT regulatory actions in New York state were struck down at the very end of 1989. A state court overruled a Suffolk County law that would have mandated employers to meet ergonomic conditions and pay for VDT workers' eye exams, while outgoing New York City Mayor Ed Koch vetoed a bill affecting city employees. Worker safety groups vow to continue strong lobbying efforts in 1990. **Page 1.**

■ **Biometric security systems** are getting a closer look from corporate data security managers in light of the well-publicized vulnerability of traditional systems to hackers. Biometric systems identify users by such unique physical characteristics as fingerprints or vocal traits. But biometric technology is far from perfect and can be expensive. **Page 16.**

■ **Users are hopeful** that a newly formed relational database vendors' group can arrive at a plain-vanilla standard for SQL. The SQL Access Group includes such major vendors as Oracle, Ingres, In-

formix, DEC, Hewlett-Packard and Tandem. **Page 12.**

■ **On-site this week:** War games are serious business at Syscon in Washington, D.C., which uses the Ingres relational database on a DEC VAX 8650 to help design better contingency scenarios for the U.S. Joint Chiefs of Staff. Syscon's Center for Modeling, Simulation and Gaming is the stuff of Tom Clancy novels, and the best-selling author was himself a recent visitor to the center. **Page 25.** Although you're not supposed to judge a book by its cover, a smart-looking color report from a stock market analyst attracts more attention. Shearson Lehman uses an Interleaf desktop publishing system on Apollo workstations to print reports for its clients. **Page 33.** Dyersburg Fabrics in Dyersburg, Tenn. is stitching together a new wardrobe of applications using Linc, the fourth generation language from Unisys Corp. The two-year software overhaul will replace some applications that date back as far as in 1966. A new Unisys A12 mainframe acquired late last year will support the effort. **Page 26.**

■ **How do you identify the perfect trainer?** He is articulate, knowledgeable, can adapt to varying needs, exudes an air of confidence, commands respect, entertains while teaching, builds a rapport with students easily and believes in the value of education. **Page 113.**



# SYNCSORT PRESENTS 3 NEW WAYS TO MAKE SHORT WORK OF LONG JOBS.



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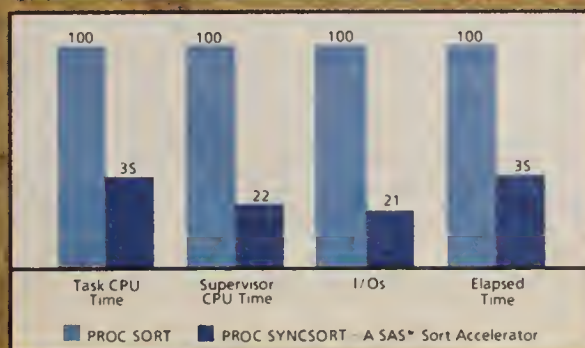
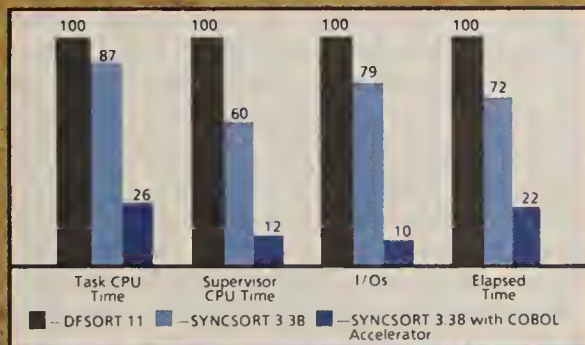
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# Across-the-board rollouts from HP

BY MARYFRAN JOHNSON  
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. is expected to pull off one of the largest product introductions in its history this week, taking care to soothe nervous workstation users of its Apollo Computer subsidiary while beefing up HP workstations and high-end systems.

Introduced today from its California offices will be the first 50-MHz workstations based on Motorola, Inc.'s 68030 chip — the fastest boxes yet to hit a market already known for sizzling speed.

But the major market splash takes place Wednesday in New York, where HP is expected to announce new products in the HP 3000 series based on the 48-MHz proprietary chip.

The high-end 3000 minicomputer to be unveiled on Wednesday is likely to weigh in with a performance level of 50 to 60 million instructions per second, according to industry analysts.

Analysts are also predicting broader changes in the company's internal organization, with particular attention paid to a line of server machines for on-line transaction processing.

The new model would be available toward the end of the year, according to industry sources, either on its own or in a board swap from HP's earlier high-end Models 955 and 960. The new chip architecture is based on submicron etching of CMOS chips, similar to that used in 4M-bit memory chips.

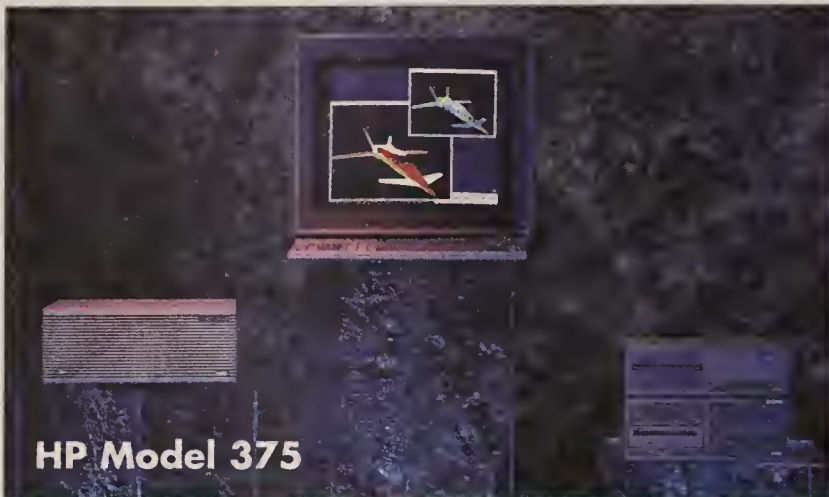
The new graphics workstations to be unveiled today join

the HP9000 Series 300 with an entry-level Model 345 and a high-end Model 375 (see chart). Their target markets include design automation, software development, electronic publishing, image processing and scientific computing.

HP users on the Series 300 machines can get the same board upgrade for any model except the new entry-level 345, which requires a machine swap. Such an upgrade offers substantial performance gains, with the machines running at least three

## Upgradable you

Hewlett-Packard's 345 and 375 lines are both based on the 50-MHz Motorola 68030, with the 375 offering board-level upgrade to the forthcoming 68040



Model*	Memory	Graphics	Price
345 MH	4M bytes	1,280 x 1,024 monochrome	\$8,995
345 Turbo SRX	8M bytes	1,280 x 1,024 3-D color, 24 backplanes	\$23,995
375 MH	8M bytes	1,280 x 1,024 monochrome	\$21,995
375 Turbo SRX	8M bytes	1,280 x 1,024 3-D color, 24 backplanes	\$39,995

\*Selected models

SOURCE: ORACLE CORP.

CW CHART: JOHN YORK

To keep its Apollo customers happy, the company has announced board-swap upgrades to the not-yet-available 68040 chip for Domain/OS users on the Series 3500 and 4500 workstations.

times faster.

The HP Model 375 workstation was specially designed for an easy upgrade to the 68040 chip, which HP will offer at a promotional price of \$2,000.

Company officials said they

cannot set prices yet for the other board swaps because Motorola is not ready to release the long-awaited 68040 microprocessor.

Several users and analysts said the release of both the board upgrade and the 68040 machine itself is likely only a few months away.

"HP/Apollo have a strategy that makes a lot of sense: upgradability," said Chuck Claydon, a product manager in charge of 150 Apollo workstations at Battelle Memorial Institute in Columbus, Ohio. "The one thing I find fault with from the competitors is a lack of an easy and affordable upgrade path for the box."

News of the impending 68040 upgrade was welcome in Claydon's shop, particularly if the price falls in the rumored \$6,000 to \$7,000 range. "When you've sunk a lot of cost in your old machines, you want to give them new life," he noted.

The upgrade involves changing the CPU on the motherboard, a task to be done by field engineers from HP, said Bob Weinberger, manager of systems product marketing. "The intent of his upgrade is really to protect the investment of the installed base," he said.

"That is definitely a soothing message for their user base," said Fred Mervine, a computer scientist with Parc Place Systems in Mountain View, Calif. "With upgrades for the 3500 and 4500, it's obvious they do plan to merge the lines, not just drop one. They're making them more and more compatible."

Senior West Coast correspondent J. A. Savage contributed to this story.

# Lotus briefings aimed at burying 1-2-3 ghosts

BY PATRICIA KEEFE  
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. will use a series of briefings this month to finally put to rest the specter of its unfulfilled May 1987 announcements. Analysts said Lotus plans to blast away the confusion obscuring the delivery dates of multiplatform versions of 1-2-3.

In briefings this week and on Jan. 25, Lotus executives will update stale statements of direction on corporate and product strategy. Year-end figures will go to Wall Street on the 25th.

And on Jan. 17, Lotus and Sun Microsystems, Inc. will detail availability of 1-2-3 ports to Sun's Scalable Processor Architecture, Intel Corp. 80386 and Motorola, Inc. 68000 platforms under Sun's Openlook — ports first announced in 1988.

At minimum, analysts and users expect Lotus to announce delivery by the end of the first quarter of both 1-2-3/G, which runs under OS/2's Presentation Manager, and Sun ports.

"It's pretty clear to me that by the first half of the year, [Lotus] will have four new versions of 1-2-3 out the door," said David Bayer, a software analyst at Montgomery Securities, who also cited versions for IBM mainframes and Digital Equipment Corp. VAXs.

In particular, 1-2-3/G has been a long time in arriving. In May 1987, Lotus celebrated the five-year mark by announcing a 10-year joint marketing pact with IBM. It also unwrapped plans for future versions of 1-2-3 that have haunted them since.

These products included an IBM mainframe spreadsheet (1-2-3/M), expected then to ship

in early 1988, along with plans for 1-2-3 Release 3, which shipped June 20, 1989, and 1-2-3/G, then slated for delivery following the expected release of Presentation Manager in 1988 [CW, May 4, 1987].

## Mum's the word

Yet more than 2½ years later, neither G nor M has shipped, nor has much more been said about the ballyhooed IBM partnership.

"Any time Lotus announces a release date more than a few weeks off, you've got to be a little skeptical about it," warned David Cearley, a software analyst at Gartner Group, Inc.

Versions of the venerable spreadsheet for IBM mainframes and DEC's VAX/VMS environment, which are to be marketed by the respective industry heavyweights, are expected to ship by the second quarter.

The consensus among analysts is that Lotus' four-pronged strategy with 1-2-3 will not provide much in the way of short-term revenue, but it will allow users to mix and match their

spreadsheet platforms without penalty. "Lotus is saying to users, 'We're not going to dictate platforms to you,'" Bayer said.

The most likely candidate to get off to a quick start is 1-2-3/G. Beta-test users talking to Computerworld and Tim Bajarin, an analyst at Creative Strategies Research International, Inc., have given it high marks.

However, users will need the 386 version of OS/2, which will provide a mix of 16-bit and 32-bit functionality, to fully exploit the capabilities of 1-2-3/G, and that is not expected to ship until later this year. "OS/2 won't become an important environment until 1992-93," Bayer said. In 1991 and beyond, 1-2-3/G will be the real "gangbuster" product, Cearley added. The alliance with Sun is important in that it allows Lotus to hitch its wagon to the leading workstation vendor, said John Dunkle, a consultant and president of Workgroup Technologies.

There are unconfirmed reports that Lotus will also release new versions of Symphony (2.2) and Magellan (2.0) this quarter.

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# Users rank Oracle #1. On Mainframes. On VAXs. On UNIX®. On PCs.

**GCN Product Preference Survey: IBM/Plug-Compatible DBMS**

Product/Company	Overall Weighted Rating	Reliability	Performance	Vendor Support	Security	Documentation	Development Environment	Ease of Administration	Distributed Operations	SQL Interaction	Multiple Operating Environments	Price	Graphics
Oracle Oracle Corp.	71	75	75	70	70	70	72	66	71	77	80	61	61
DB 2 IBM Corp.	70	78	75	75	75	70	68	67	67	70	66	59	60
SQL/DS IBM Corp.	68	73	71	70	71	66	67	67	63	75	67	61	62
IMS/DB IBM Corp.	67	74	75	75	69	66	67	66	63	61	64	58	61
Adabas IBM Corp.	66	76	75	69	71	66	68	67	62	56	65	59	55
Focus Information Builders Inc.	66	73	70	70	62	66	68	66	64	55	72	60	57

**GCN Product Preference Survey: DBMS for UNIX**

Product/Company	Overall Weighted Rating	Reliability	Performance	Vendor Support	Security	Documentation	Development Environment	Ease of Administration	Multiple Operating Environments	Distributed Operations	SQL Interaction	Price	Graphics Support
Oracle Oracle Corp.	72	79	79	69	74	70	71	67	80	73	79	59	60
Informix Informix Software Inc.	69	79	77	66	67	66	72	69	72	68	68	64	52
Ingres Relational Technology Inc.	66	70	71	69	67	65	67	67	71	58	68	55	56
Unity Unity Corp.	62	67	68	57	65	60	65	62	63	62	65	61	50

**GCN Product Preference Survey: DEC VAX/VMS DBMS**

Product/Company	Overall Weighted Rating	Performance	Reliability	Vendor Support	Documentation	Security	Development Environment	Ease of Administration	Distributed Operations	Multiple Operating Environments	SQL Interaction	Price	Graphics
Oracle Oracle Corp.	70	74	76	69	68	70	73	66	71	78	76	56	60
VAX DBMS Digital Equipment Corp.	68	73	78	74	68	71	68	69	67	65	61	60	62
RDB/VMS Digital Equipment Corp.	67	71	77	77	69	69	62	66	65	57	62	64	54

**GCN Product Preference Survey: LAN Data Managers**

Product/Company	Overall Weighted Rating	Reliability	Compatibility With Existing Network	Speed	Compatibility With Single-User Files	Standards Compatibility	Programming Features	Record Locking	Cost	Third-Party Support	Network Licensing Features	Vendor Advice
Professional Oracle Oracle Corp.	71	79	75	76	67	75	76	77	58	68	65	61
R:Base for DOS Microrim Inc.	70	75	75	68	72	68	72	69	72	64	73	60
dBase III Plus Ashion-Tate Corp.	68	73	73	67	72	73	71	64	64	67	64	57

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CA	Costa Mesa	Jan 23cf Feb 15p
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	Los Angeles	Jan 25fp
		Feb 15f* Feb 22cf
	Ontario	Jan 9f
	Sacramento	Jan 9p
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	San Francisco	Jan 18fu Feb 15cf
	Santa Barbara	Jan 16f
	Santa Clara	Jan 11f Feb 13fp
	Woodland Hills	Feb 13f
CO	Colorado Springs	Feb 21
	Denver	Jan 23u
CT	Farmington	Feb 8f
	Stamford	Jan 16f
DC	Washington	Jan 23* Feb 6*
FL	Fort Lauderdale	Feb 20f
	Fort Myers	Feb 16f
	Miami	Jan 16c
	Tampa	Jan 18f
GA	Atlanta	Feb 7f
	Columbus	Feb 6c
IA	Boise	Feb 6
	Des Moines	Jan 16f
IL	Chicago	Jan 11f# Jan 18f
		Feb 6f# Feb 13u
IN	Fort Wayne	Feb 22f
	Indianapolis	Jan 23f
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	Grand Rapids	Jan 25f
MN	Minneapolis	Jan 9p Feb 6cf
MO	Kansas City	Jan 17f
	St. Louis	Jan 10f Feb 7cp
NC	Charlotte	Feb 6f#
	Raleigh	Feb 1f#
NE	Omaha	Jan 30
NJ	Cherry Hill	Jan 10f Feb 21c
	Iselin	Jan 9f Jan 30f Feb 13c
NY	Albany	Jan 9f
	Buffalo	Jan 17f
	Corning	Jan 16f
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# NEWS SHORTS

## Prime in ISDN test . . .

Prime Computer, Inc. last week proclaimed itself the first major computer vendor to successfully mesh its proprietary wide-area networking system with the Integrated Services Digital Network (ISDN) high-speed Primary Rate Interface (PRI). In a test jointly set up with AT&T and Bellsouth Corp., Prime 2650 and 2450 superminicomputers used Primenet, an X.25 network, to exchange packet-switched data via an AT&T 5ESS ISDN central office switch at speeds of up to 1.5M bit/sec.

## . . . then there's Southwestern Bell

Southwestern Bell Telephone Co. (SWBT) last week said it has successfully completed a test of multivendor PRI ISDN for a customer. The four-week trial linked a Northern Telecom, Inc. Meridian SL-1 private branch exchange in Kansas City, Mo., with an AT&T 5ESS at SWBT's Advanced Technology Laboratory in St. Louis. The test measured PRI compatibility with the different companies' equipment. A SWBT spokesman said one of the goals of SWBT customers is to have PRI ISDN using multivendor equipment.

## DEC inks big integration pact

Digital Equipment Corp. announced its largest and most comprehensive systems integration deal, a contract estimated at close to \$10 million to integrate 30 Microvax 3400 minicomputers with 1,000 Apple Computer, Inc. Macintosh computers. The contract calls for connecting 72 branch offices of Hartford, Conn.-based Aetna Life and Casualty Corp. with the Microvaxes working as file, print and data servers for the Macs. The Microvaxes will also serve as connecting points between the PCs and the IBM host systems in Aetna's home office.

## Zenith quits Unisys protest

Unisys Corp. and Zenith Data Systems reached a settlement last week that dismisses Zenith's protest of the Desktop III contract to supply up to 250,000 microcomputers to the U.S. Air Force, which Unisys won with a bid of \$706 million [CW, Nov. 27]. Under the settlement, Zenith dropped all charges that the Air Force unfairly changed specifications to favor Unisys.

## Zenith quits Zenith

Zenith Electronics Corp. stockholders gave final consent late last month to sell Zenith's computer business to Groupe Bull. The final purchase price was \$496.4 million in cash, 10% less than originally estimated because of inventory reductions. Zenith will use the cash to pay off some of its \$560 million debt.

## Soviet Bloc drive shipments OK'd

The U.S. Department of Commerce has agreed to decontrol exports of 50M-byte Winchester disk drives to Eastern Europe and the Soviet Union at the request of Seagate Technology, a vendor based in Scotts Valley, Calif. With the assistance of APCO Associates, a consulting firm in Washington, D.C., Seagate successfully argued that comparable products are readily available to the Soviet Bloc from Japanese and Korean sources, making U.S. export controls ineffective.

## Asian makers notch chip gains

North American makers lost another 2% of the worldwide semiconductor market last year, according to a study released last week by San Jose, Calif.-based market research firm Dataquest, Inc. North American manufacturers now claim 35% of the worldwide market, down from 37% in 1988. Asia/Pacific Rim manufacturers other than Japan made the biggest market gains, growing four times faster than the 1989 worldwide average of 10%.

*More news shorts on page 117*

## Lottery

FROM PAGE 1

clocks stayed still and the terminals stayed on.

Luckily, a backup to the Cyber 930 main computer correctly time-stamped each ticket sold after the drawing. Consequently, CDC programmers were able to program the system to automatically identify and disqualify most of these tickets before they could be cashed in. Only \$90,000 was paid out and \$35,000 of that was returned voluntarily by ticket agents.

"We feel as if we were betrayed a bit [by the system] that night," said lottery director Otho Brown. "But the same system that betrayed us also allowed us to manage the problem.

So it is both a curse and a blessing."

The state has not given up on the remaining \$55,000. "We're recovering the money by identifying the agents that sold the tickets, and then they're revealing the individuals who cashed them," Brown said. Delaware state police are conducting the ongoing investigation.

### No gain, no pain

Although no arrests have been made, Brown said it will be up to the state attorney general to prosecute individuals who fail to return their ill-gotten gains.

CDC has volunteered to reimburse the state for any money that slips through the dragnet, Brown said. "The state will not suffer any loss," he noted.

A no-liability clause was in-

cluded in the CDC contract. "We never envisioned this sort of thing happening," Brown explained.

He added that he is not contemplating any legal action against CDC.

Meanwhile, CDC has installed and is currently testing new software code intended to shut down the ticket terminals if their clocks should freeze again.

The Delaware lottery has been on-line and trouble-free since 1978, according to Brown. But this incident has led to a permanent change in procedure.

"We must now have a lottery official verify that the system has shut down before we conduct the drawing," Brown said. "In the past, we relied on the cutoff being done automatically by the computer."

# Big shoes to fill at Microsoft

*No natural successor seen to retiring President Jon Shirley*

BY CHARLES VON SIMSON  
CW STAFF

REDMOND, Wash. — It has long been said that departing Microsoft Corp. President Jon A. Shirley was the only man in the industry with whom Chairman Bill Gates would go into a dark room. Finding a successor who enjoys that level of trust from the often moody Gates may be the biggest obstacle in filling one of the industry's most prominent jobs.

"There will be a large chemistry component to filling the position," said David Bayer, software analyst at Montgomery Securities in San Francisco. "But Gates respects a first-rate mind, and No. 2 at Microsoft still has a strong say in the shape of the industry."

**T**HEY NO LONGER need a diplomat in the job as much as they need a poker player."

BRUCE LUPATKIN  
HAMBRECHT & QUIST

Shirley announced recently that he will leave Microsoft on June 30, after seven years as president. His departure has been in the works for some months and is an amicable break, according to Microsoft executives.

Shirley, 52, said he will pursue personal interests upon retirement. He will leave Microsoft with 500,000 shares, which are at a current value of more than \$40 million. Shirley will remain a consultant and member of the board of directors at Microsoft.

Shirley's combination of

knowledge of retail channels, management maturity and the trust of Gates is not enjoyed by Microsoft's other senior vice-presidents: Michael J. Maples, Jeremy Butler, Scott D. Oki and Steven A. Balmer. Maples came from IBM, Microsoft's most important ally. Butler and Oki head international and U.S. sales, respectively. Balmer runs the systems software division, which supplies MS-DOS and OS/2.

"I would be glad to see any of them in the job," Bayer said, "but I think that Microsoft will look more thoroughly outside the company to fill this job than [they would] for any other position they could fill internally."

While he is considered the dark horse of the four by many observers, Balmer is seen as the most credible executive on both

technology and marketing issues when dealing with large corporate customers.

"As far as I am concerned, and among people I have talked to, Balmer gets much higher marks than Gates in terms of addressing user issues. In our constituency, he is increas-

ingly the face of Microsoft," said an IS director at a Fortune 100 company.

### Shining star

Shirley was a star at Tandy Corp. when he left in 1983 to come to Microsoft. Seen by most observers at the time as a likely candidate for the position of chief operating officer and perhaps even as a successor to Chief Executive Officer John Roach, his departure after 25 years at Tandy was as quick and surprising to outsiders as this latest announcement of his retirement.

When he joined the company,



**Shirley leaving Microsoft**

Shirley brought to Microsoft experience in the first retail sales of computers, having risen up through the Radio Shack organization after dropping out of MIT. He was seen by all observers as an intensely bright and talented manager with the maturity to offset Gates' demanding and often trying style.

However, many see the president's post changing along with the growing security of Gates, as well as Microsoft's evolving position in the industry. "They no longer need a diplomat in the job as much as they need a poker player," said Bruce Lupatkin, an analyst at Hambrecht & Quist, Inc. in San Francisco. "IBM is hedging their relationships all over the place, and where the company used to need Shirley to steady the course, they now need a person skilled at calling bluffs," he said.

While Shirley was not prominent in the company's technological direction, he was the architect of the financial and managerial infrastructure that allowed the organization to grow aggressively through the 1980s.





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# HP, Northern Telecom join forces

BY J. A. SAVAGE  
CW STAFF

SANTA CLARA, Calif. — Hewlett-Packard Co. teamed up with Northern Telecom, Inc. last week to offer HP hardware-based products that can connect HP's minicomputers to Northern Telecom's Meridian SL-1 private branch exchange (PBX). The group of products is primarily aimed at applications that pull caller information out of a host database and then deliver it to a workstation while the call comes in.

The HP-Northern Telecom alliance is only the latest in a series of recent agreements between computer and PBX makers aimed at providing similar services. Virtually every major host and PBX vendor is involved in such an agreement.

The software connects an HP 3000 host computer through an HP 9000 Unix-based workstation, which acts as a call-processing server with the company's Applied Computerized Telephony software.

Northern Telecom's Meridian PBX runs Integrated Services Digital Network (ISDN) applications protocol software, which is necessary in order to deliver caller identification information automatically and transparently. Otherwise, the caller must key in a phone number in order to access the host information.

## Mixing and matching

The companies claim that the applications interfaces for HP's Unix workstations are the first such Unix-based interfaces to be made available commercially for an ISDN. Using open standards for linking PBXs and hosts would benefit users who want to mix and match hardware.

Yet representatives from both companies did not know whether other Unix workstations could be substituted for the 9000 in this system.

The Unix workstation could be utilized as a stand-alone system with both the call-processing application and other Unix applications, but the HP 3000

minicomputer cannot be used to connect directly to the PBX, according to Mike Glenn, vice-president of sales at Northern Telecom's Corporate Network Operations.

Interface standards are at least a year away, according to Mike Howard, vice-president of research at Infonetics, Inc. in Santa Clara, Calif.

The system has not addressed the difficulty of delivering automatic number identification between regional phone carriers. Users would require an 800 number for the system to be most effective, according to Glenn. The system has been developed cooperatively and will be marketed under a joint entity, the Corporate Networks Operation.

The price of the Meridian software ranges from \$10,000 to \$20,000, depending on the size of the PBX. The Applied Computerized Telephony software costs \$10,000, and the interfaces run between \$495 and \$21,000, depending on the size of the processor.

## Netview/PC

FROM PAGE 1

hire a team of IBM technicians who have been working under contract to the manufacturer for about a year.

"Netview/PC is not an off-the-shelf solution, whatever anyone says," Dorian noted.

## Netview wild card

GE, like many other Fortune 500 IBM shops, saw Netview as "the only card game in town," Dorian said. But while companies such as Sears Technology Services, Inc., Electronic Data Systems Corp. and American Express Co. have developed their own direct links to Netview, GE bought into IBM's Netview/PC concept of setting up a microcomputer as a liaison between Netview and non-IBM networking systems.

Some GE installations still use the older PC-DOS version of Netview/PC to pass network alerts and alarms up to Netview. However, the system's low random-access memory ceiling and single-tasking operation severely curtail its ability to handle two-way communications between Netview and multiple devices, users have reported.

This makes the OS/2-based Release 1.2 of the product crucial to the next phase of GE's network management project, in which Netview/PC will be simultaneously passing alerts and alarms up to Netview and commands from the system down to networking devices.

Other items on GE's network management shopping list had to

be specially commissioned from IBM. Some are slated to become commercially available — but not fast enough or in exactly the right form for GE.

For example, the company's telecommunications managers are not used to dealing with lines of technical code "squirreling down the screen" and want their information to be presented in English and graphics, Dorian said.

An IBM spokesman confirmed that the vendor's current graphics-based Netview interface, bought from US West, is meant to be a stopgap solution until the vendor's own interface is completed. GE has commissioned a modified version of that interface, Dorian said.

Multivendor support was another area in which GE needed IBM's help. GE also discovered that despite IBM efforts, third-party connections to Netview/PC remain thin.

As a result, IBM's team had to develop such links from scratch for much of GE's networking facilities, which include Tellabs, Inc. and Timeplex, Inc. switches and AT&T network services that GE manages via the carrier's Bandwidth Management System. Timeplex's existing Netview/PC link only needed minor modification, Dorian said.

## Easier integration

In the year since GE hired IBM to do its Netview/PC work, the vendor has made it easier to integrate third-party networking systems under Netview, said IBM spokesman Stan Kimer. IBM recently announced a cus-

tomers support program for a Netview/PC application generator from Carl Vanderbeek and Associates and plans to announce three more such products within the next month, he added.

## Next phase

In the next phase of GE's project, IBM will develop applications under Netview for analyzing incoming data so that the system will be able to pinpoint a trouble spot and initiate corrective action with minimal operator intervention, Dorian said.

"I was in the Coast Guard for 26 years, and I know that the critical portion of a search and rescue is the search portion," he said.

In order to do this effectively, the system will need a unified view not only of IBM data centers but also of both the private and public segments of GE's network, Dorian said. To this end, GE, IBM and AT&T are setting up two-way data sharing between GE's Netview and an AT&T Unified Network Management Architecture-based system that will reside at an AT&T service center in Princeton, N.J. The center is dedicated to supplying GE's wide-area networking needs, Dorian said.

As a result of its relationship with IBM, GE is likely to get the kind of network management system many managers can only dream about — much sooner than its competitors. Nor can IBM make commercially available any of the work it is doing for the giant manufacturer. "We paid for it, and it's our software now," Dorian said.

# IBM stirs expert systems into SAA development stew

BY ROBERT MORAN  
CW STAFF

IBM has added an expert systems builder to its growing ranks of Systems Application Architecture (SAA)-compliant software, but analysts said the strategy seems targeted at a limited group of large users.

According to IBM, The Integrated Reasoning Shell (TIRS), will become available this July and will allow developers to build knowledge-based applications on the IBM Personal System/2 or its Unix workstation, the RT, and run the knowledge-based applications on those platforms as

tributed applications.

Furthermore, Dunkle said that TIRS, running on a personal computer in conjunction with IBM's Presentation Manager, will permit users to access information across multiple server platforms more efficiently.

Although IBM may be sowing seeds for future growth, it has yet to set a date when users can harvest the fruits of TIRS on the Application System/400, one of the principal SAA platforms. IBM said that it will provide support for the processor but would not offer a specific delivery date.

Beta-test user Paul Quinn, vice-president of MIS at Mrs. Fields, Inc. in Park City, Utah, is counting on IBM to deliver TIRS for the AS/400. Mrs. Fields, which runs embedded expert systems applications on the AS/400 built with IBM's Knowledgetool 2.1, has had TIRS for about three months. "TIRS has richer features and functions than Knowledgetool," Quinn said. "As TIRS becomes available in the AS/400 delivery environment, there is no question that we will move to TIRS."

Quinn said that TIRS is a superset of IBM's Knowledgetool 2.1 and will run Knowledgetool applications with some modification. However, he said, applications are not interchangeable between the two.

## Forward pass

TIRS offers forward and backward "chaining," a programming technique, while Knowledgetool offers only backward chaining. Forward chaining automatically updates a compound document when changes are made to one of its components.

According to Quinn, users of Knowledgetool must write enabling software to accomplish what TIRS does automatically.

Quinn said that Mrs. Fields will develop stand-alone OS/2 expert systems applications, then build cooperative-processing applications and embed the expert systems in traditional applications on the AS/400.

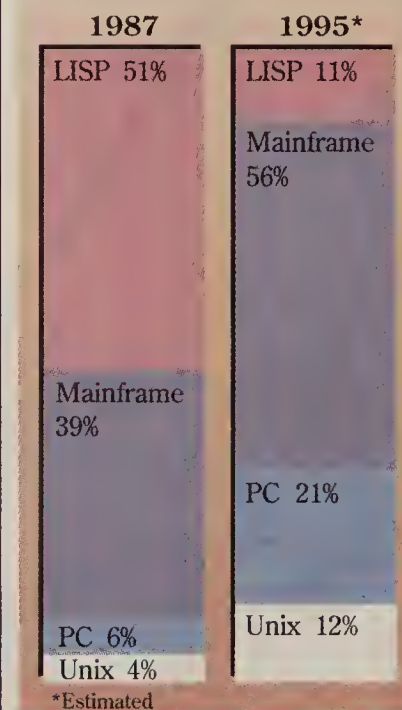
Dunkle said that TIRS will displace IBM's Knowledgetool and Expert System Environment for highly specialized applications, but users will continue to use older products in prototypes and smaller applications.

According to the vendor, TIRS costs \$7,500 for the Development System and \$750 for the Runtime System on the PS/2 and the RT workstation. For System/370s, prices range from \$11,000 to \$113,000 for the Development System and from \$3,000 to \$28,000 for the Runtime System, depending on processor size.

## Into the mainstream

*Dedicated machines are giving way to general-purpose processors as expert systems platforms*

PERCENT OF TOTAL REVENUES FOR EXPERT SYSTEMS BY HARDWARE PLATFORM



SOURCE: MARKET INTELLIGENCE RESEARCH CORP.

CW CHART: DOREEN DAHLE

well as the VM and MVS operating systems.

In addition, IBM touts TIRS, which was introduced in late December, as part of AD/Cycle, its SAA applications development strategy.

## Trail of TIRS

While AD/Cycle tools will populate databases on different systems, and IBM's repository will keep a constant log of an enterprise system's databases and updates to them, knowledge-based applications written with TIRS will determine where the system goes to get information, according to John Dunkle, president of Workgroup Technologies in Hampton, N.H.

According to Dunkle, TIRS is a systems builder as opposed to simply an applications builder; it is an intelligent overlay to communications protocols that will allow independent software vendors, for example, to build dis-



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# New face enters parallel computing

BY JAMES DALY  
CW STAFF

SUNNYVALE, Calif. — Silicon Valley start-up Masspar Computer Corp. will enter the high-performance computing world tomorrow with a line of Unix-based systems that company of-

ficials claim provide near-supercomputer performance at mid-range minicomputer prices. Software availability for the machines, however, may be another matter.

Masspar's MP-1 family is based on a massively parallel architecture, in which thousands of

processors slice up and then attack a computational problem.

In effect, the chips work like bees in a hive. Although none of the members is very bright or strong individually, when joined together incredible jobs can be done at lightning speeds.

The MP-1 family uses up to

16,384 custom-designed microprocessors to deliver computational processing capabilities of up to 30 billion instructions per second and 1.5 billion floating-point operations per second, Masspar officials said.

Because parallel processing machines hold the promise of far greater power than serial processing machines, they have made inroads in computationally

demanding areas such as scientific research and engineering.

President Jeff Kalb said Masspar plans to shoot at the minicomputer market by offering the product at an entry-level price of \$170,000. Since the MP-1 family uses a Digital Equipment Corp. Vaxstation 3520 as a front end, Kalb said the MP-1 line will make a tough challenger for pricier DEC VAXs when it begins shipping this month.

Masspar officials said they hope to circumvent a lack of software for massively parallel systems by allowing the MP-1 to use parallel programming principles and including a developer's tool kit with each system. Software for serial architectures will not take advantage of massively parallel systems and has to be reworked and recompiled to run on the systems.

Analysts said the massively parallel machines could be the only way to achieve the speeds that science and engineering fields require. "[The Masspar machines] are another nail in the coffin of the traditional serial system," said Richard Hill, editor of "The Spang Robinson Report on Supercomputing and Parallel Processing" newsletter.

## I860-based super on tap

BY JAMES DALY  
CW STAFF

Intel Corp. is expected to announce plans for a powerful supercomputer based on multiple I860 microprocessors, sources said. The announcement may come at a press conference today in New York.

The new configurations are expected to be offered with between eight and 128 processors and range in price from \$250,000 to over \$1 million.

While Santa Clara, Calif.-based Intel is best known in the chip-making business, the firm also boasts a substantial systems manufacturing capability that could produce \$1 billion in revenue this year, said Millard Phelps, an analyst at Hambrecht & Quist, Inc. in San Francisco.

Intel is no stranger to the high-performance computing business. The firm's Beaverton, Ore., facility — Intel Scientific Computers — offers a supercomputer composed of many 80386 microprocessors linked into one complex system.

Although the I860 packs one million transistors and is capable of processing 10 million instructions per second, critics have questioned Intel's claim that the 64-bit chip can adequately serve as a stand-alone microprocessor.

Some analysts say the chip would serve better as a graphics or math coprocessor.

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# Group writing Rx for SQL pains

*RDBMS heavy hitters mull own standard to resolve compatibility issues*

BY JEAN S. BOZMAN  
CW STAFF

SAN FRANCISCO — Users will get a prescription for their relational database management system compatibility headaches by early 1991, a group of major RDBMS and hardware vendors claim.

That relief is expected to be in the form of a unified industry-wide SQL standard, developed by SQL Access Group, a newly formed vendor group. The group hopes to develop a plain-vanilla SQL — by mutual agreement among dozens of hardware and software vendors — that will iron out frustrating differences between various implementations of SQL on different hardware and operating systems. This unified version of SQL would address many functional areas that are not now specified by either the ANSI-standard version of SQL or by the Remote Database Access Committee of the International Standards Organization (ISO).

The SQL Access Group includes most major relational database management system vendors and many leading hardware firms. Among them are Digital

Equipment Corp., Hewlett-Packard Co., Tandem Computers, Inc., Informix Corp., Ingres Corp. and Oracle Corp. The group, which meets monthly, plans to demonstrate a prototype SQL by year's end.

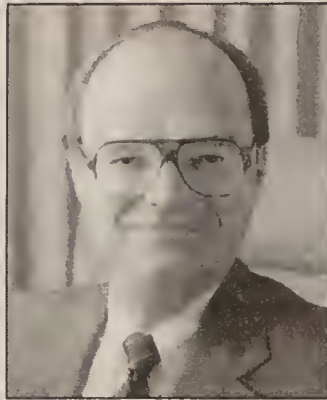
The SQL Access proposal has support among large user sites that are trying to manage the complexities of multiple RDBMSs. "Every one of these DBMS has a different dialect of SQL," said Dave Summers, database software administrator at Pacific Power & Light Co., the Portland, Ore.-based public utility that uses both Oracle and DB2. "The dialects are all close to each other, but they're all different."

As a result, Summers said, end users cannot choose which database they query — and the DBMS they use is often preselected by the end user's job title.

Right now, different flavors of

SQL offered by different vendors vary in areas such as data-dictionary formats, error messages and communications protocols.

The SQL Access members say they are trying to speed up the lengthy, often frustrating, process of defining industrywide SQL standards through the ANSI and ISO committees that are working on the problem.



**SQL Access' Sippl seeks complete compatibility**

"The SQL standards specifications produced by ANSI are not complete enough so that one vendor's products will be completely compatible with another's," said SQL Access Chairman Roger Sippl, chairman of RDBMS vendor Informix, in Menlo Park, Calif. Most SQL Access member firms are already active on the ANSI and ISO committees, he said.

One notable absence from the SQL Access Group member list is IBM, which invented SQL in the 1970s. However, the vendor is "staying close to what's hap-

pening with the SQL Access Group," IBM spokesman Andy Kendzie said last week. "But, in terms of our active participation, we'd prefer to deal with groups we've dealt with historically. We're working to make our architecture as open as possible within the framework of our membership in the ANSI and ISO standards organizations."

Even without IBM's direct participation, the SQL Access Group hopes to make SQL queries transparent through vendor-to-vendor agreements. That way, end users could make the same query against multiple databases, without regard to the brand of RDBMS used.

"The point of the SQL Access Group is to take the ANSI-standard SQL and make it interoperate through vendor agreements," said Eric Wasiolek, manager of distributed products marketing at Ingres in Alameda, Calif., who serves on the SQL Access Group's management committee.

Vendors say they are motivated to cooperate by a kind of enlightened self-interest, since each will have to write dozens of interfaces to other vendors' RDBMS products if a single SQL standard is not developed now.

Users at some large sites agreed. "We would definitely be interested in efforts to provide a standard SQL," said Arnold Taube, a marketing manager at

Deere & Co. in Moline, Ill. "It would be nice to have plain-vanilla SQL queries that you could pass around the network and have them work without change."

Whether the effort can succeed quickly — or without IBM's direct involvement — is unclear. "It may be that the SQL Access Group is trying to get enough presence to influence IBM to follow their standard or to get enough market clout to influence users to follow the new SQL standard," said Tom Sawyer, senior consultant at Codd and Date Consulting Group in San Jose, Calif., which specializes in RDBMS research. "But it may be naive for them to assume that they can get SQL standards a lot quicker than ANSI can."

## SQL Access Group Members

Ashton-Tate Corp.  
Digital Equipment Corp.  
Fujitsu America, Inc.  
Hewlett-Packard Co.  
Informix Corp.  
Ingres Corp.  
Metaphor Corp.  
NCR Corp.  
Oracle Corp.  
Sun Microsystems, Inc.  
Tandem Computers, Inc.  
Teradata Corp.

## VDT forces

FROM PAGE 1

posture. Rhode Island's law, passed in 1985, required the state department of labor to produce a brochure on VDTs in the workplace.

"Though the [Suffolk County] legislation is well intentioned and ultimately may prove to be an important first step in bringing worker health concerns . . . to the attention of the public, the Suffolk County Legislature lacked the authority to enact Local Law 21," wrote Judge John Copertino in his decision overturning the Suffolk County law.

Copertino ruled that the county had preempted New York State's role in setting occupational health and safety guidelines. However, a companion piece of legislation that addresses state employees and was passed by Suffolk County in 1987 remains in place.

### Seen as setback

"Yes, it's a setback for local legislation," admitted Sharon Dannann, research director at the Cleveland-based 9 to 5, National Association of Working Women. "It means coalitions of unions and concerned individuals will need to carefully check out the [state] preemption issue before they act."

The first of its kind in the na-

tion, Suffolk County's VDT law was passed in May 1988 and would have gone into effect last Monday.

Local Law 21 would have required that businesses with

In addition, the law, which would have affected an estimated 170 firms and 12,000 terminals in the eastern portion of Long Island, N.Y., called for businesses to pay 80% of the

VDT operators.

Suffolk County has not received the final judgment and has not decided whether to appeal the ruling, according to the office of County Executive Patrick Halpin.

Meanwhile, other state legislatures have considered VDT guidelines — largely voluntary ones — for public agencies and private businesses.

Wisconsin is the site of the latest legislative initiative. Among the elements in Assembly Bill 608 is the recommendation that Wisconsin workers spend no more than 50% of their day in front of VDTs. The Wisconsin bill calls for the state's Department of Industry, Labor and Human Relations to monitor VDT research and develop VDT guidelines for businesses.

However, compliance with those recommendations — including the controversial 50% limit — will be voluntary for businesses in the state.

Making the guidelines voluntary was a concession to business groups in Wisconsin, which had loudly opposed a bill three years ago that contained mandatory VDT restrictions and medical exams for workers, according to an assistant to Rep. Thomas Serry (D-Wis.), who along with Sen. Joseph Czarnecki (D-Milwaukee) co-sponsored the bill. But first, the bill must survive several committee hearings and

pass both houses before the end of March, when the Wisconsin Legislature adjourns.

### An issue of job design

"Studies on VDT workers indicate that when you hit five hours [per day] or 20 hours per week, the number of [VDT-related] complaints skyrockets," said Louis Slesin, editor of the New York-based bimonthly *VDT News*.

Slesin said he believes the VDT issue "will come down to an issue of job design," with companies voluntarily limiting the exposure of workers to VDTs.

A long-awaited National Institute of Occupational Safety and Health (NIOSH) epidemiological study on VDT users, which had been expected late last year, is due in March. The paper will contain study results but not a standard, NIOSH said.

At least one terminal vendor has addressed the issue in advance of firm medical evidence or a legislative mandate, however. Last November, responding to what it called customer requirements, IBM began incorporating lower emission specifications in its mainframe terminals and said it hoped to incorporate the design into all its computer screens, including the Personal System/2 line. In 1987, IBM began providing this feature to customers in Sweden and Denmark.

## Bark but no bite

*Many states have passed VDT regulations, but few apply to the private sector*

State or jurisdiction	Employees affected	Guidelines	Date adopted
U.S.	Dept. of Justice employees	Ergonomic <sup>1</sup>	1984
	Public & private employees	Voluntary	1986
Calif.	State employees	Purchasing <sup>2</sup>	1985
	State college & university employees	Ergonomic	1988
Colo.	State employees	Purchasing	1985
D.C.	Public employees	Ergonomic	1987
Maine	Workers using VDTs more than four hours per day	Training <sup>3</sup>	1989
Mass.	Executive-branch employees	Purchasing	1984
N.J.	Public employees	Ergonomic/ Eye care	1989
N.M.	State employees	Ergonomic	1985
N.Y.	State employees	Purchasing	1985
	Public employees	Ergonomic	1987
Ore.	Public & private employees	Voluntary	1984
R.I.	Public & private employees	Voluntary	1988
Wash.	Public & private employees	Voluntary	1986
Wis.	State employees	Purchasing	1981

<sup>1</sup> Applies to both VDTs and environmental factors  
<sup>2</sup> Applies only to purchases of VDTs and related equipment  
<sup>3</sup> Mandates training on protective measures for VDT use

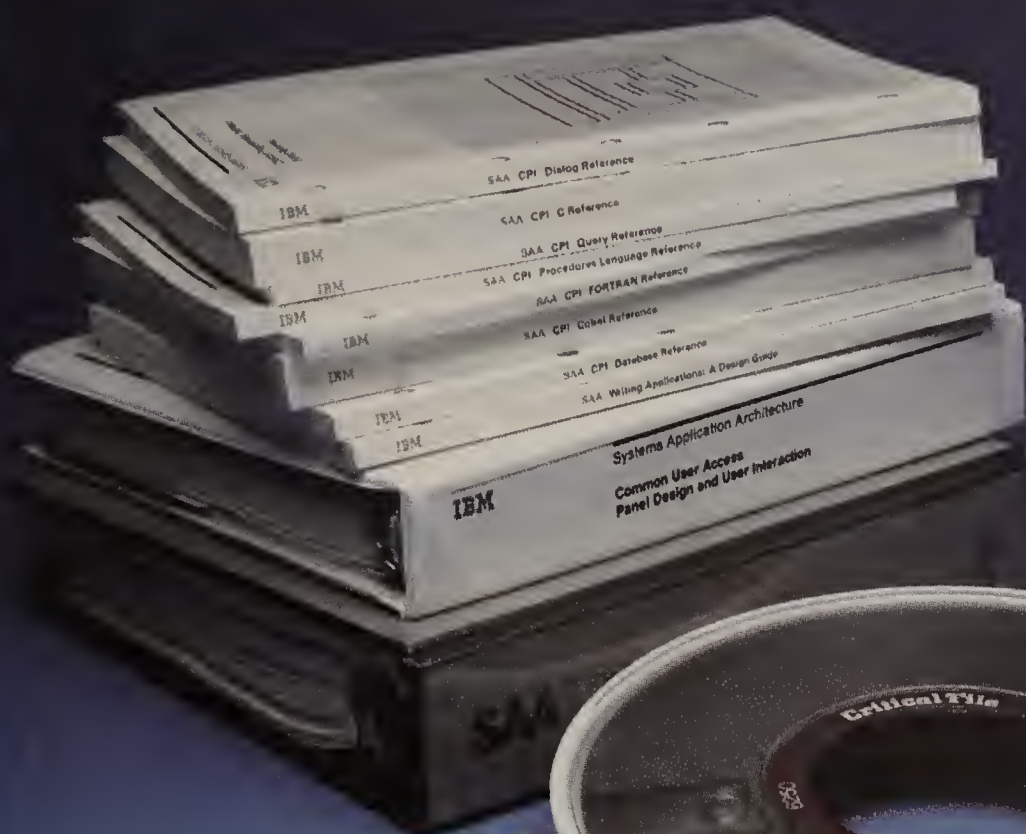
SOURCE: 9 TO 5, NATIONAL ASSOCIATION OF WORKING WOMEN

CW CHART: DOREEN DAHLE

more than 20 terminals provide ergonomic furniture, lighting and terminals for workers using VDTs for 26 or more hours per week.

cost of annual employee eye exams and eyeglass purchases, as well as to provide educational programs on VDT safety and to allow 15-minute work breaks for





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In 1978, IBM drafted the specification for a new relational database technology called Structured Query Language, or SQL. Then, in 1979, two years before IBM delivered SQL/DS, Oracle Corporation delivered the first commercial implementation of SQL and has since become the largest database company in the world.

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1:IBM Journal of SAA 2:DATAPRO survey, August 1988, companies with sales over \$10 million 3:Donaldson, Lufkin & Jenrette report

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NJ	Cherry Hill	Jan 10f Feb 21c
	Iselin	Jan 9f Jan 30f Feb 13c
NY	Albany	Jan 9f
	Buffalo	Jan 17f
	Corning	Jan 16f
	Melville	Jan 17f Feb 14p
	New York	Jan 10f Jan 24f Feb 7f Feb 21
	Rochester	Feb 6p
	Syracuse	Jan 31f
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	Cleveland	Jan 18f
	Columbus	Feb 7f
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OR	Portland	Jan 30f
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	King of Prussia	Jan 17c
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# ADVANCED TECHNOLOGY

## Biometric system use widening

*Security devices measure physical-based traits to restrict access to sensitive areas*

BY MICHAEL ALEXANDER  
CW STAFF

**B**iometric security systems — used to restrict access to computer systems and data centers — are more apt to be found on reruns of *Get Smart* and other once-popular television shows than in corporations. But it now looks as though biometric systems are about to move from *Mission: Impossible* into widespread everyday use, even though they are far from foolproof.

The many news reports in recent years of hackers breaking into corporate computer systems to cause trouble have prompted increasing numbers of information systems managers to try biometric systems, according to Gary Woods, eastern sales manager at Mosler, Inc. in Hamilton, Ohio.

The vast majority of biometric security systems have been installed in facilities involved in defense and national security — research laboratories and the like. The costs of such systems are falling, and that is also making them more attractive to corporate customers, Woods said.

As a result, biometric computer security devices are expected to top \$25 million by 1991 and balloon rapidly at an annual growth rate of 40% per year, according to a report from



TOM MONAHAN

Frost & Sullivan, Inc. Sales of biometric systems have been virtually flat — stuck at about \$25 million per year — over the brief life span of these products.

Biometric security devices measure physical traits that make each individual unique: the ridges and whorls of a fingerprint, the physiology of speech, the pattern of blood vessels in the back of the eye, the dy-

namics of writing a signature and other physical attributes.

There are six biometric technologies on the market, and at least two others are under development (see story this page). Although biometric devices aim to measure different physical characteristics, they operate in a similar fashion. A biometric profile of an individual's fingerprints, speech patterns or other traits is measured by a specialized sensor and converted from analog to digital form. The digitized signal is then processed by an algorithm, compressed to save space and stored.

Figuring out which technology is appropriate typically involves a compromise among cost, ease of use, reliability, the value of the data to be protected and other considerations.

Ideally, the system must be precise enough to reject unauthorized users but should also adapt to slight changes in a person's physical characteristics. However, the systems are far from perfect: A handprint geometry reader may reject an authorized user who recently cut her fingernails, and a voice-verification system may reject a user who has a head cold, for example.

"I think that at this point, voice verification has the most promise because the user-friendliest thing is the telephone," Woods said, adding that "it is not the ultimate: If you go to a basketball game one night and scream yourself hoarse, the next day you may not get into the system."

Another limitation is that, with the exception of voice verification, biometric units require that the user be physically present to operate the system.

The cost of biometric security devices varies widely, from \$1,000 for a fingerprint reader and \$3,000 for

a signature-verification device to \$20,000 for a voice-verification system that accommodates 1,000 users. Applications that can be operated on a network using a centralized database or based on personal computer hardware are apt to be more cost-effective, Woods said.

Hertz Corp. opted for a voice-verification system to control entry to its data centers as well as to limit access to its computer systems to users within authorized levels because it was among the least expensive and easiest to use, said Mark Stutte, director of MIS operations at Hertz. "We looked at such devices as retina scanners, fingerprint readers, signature analyzers and palm readers, but they were too expensive, and for physical access control it became an issue of how employees would react to it," he said.

Security Pacific Bank is testing a voice-verification system that is being used by bank managers at some 600 locations to ensure that fund transfers and other transactions are handled only by authorized individuals.

Bank officials are normally assigned a new password each day that enables them to telephone headquarters to retrieve confidential information about their customers and conduct other banking business.

"That did not seem quite secure enough, so we began to explore the possibilities of identifying remote corporate employees using voice verification," said Dave Bristow, vice-president of security.

**I** THINK THAT at this point, voice verification has the most promise because the user-friendliest thing is the telephone."

GARY WOODS  
MOSLER

## Detection methods

**L**imiting access to a computer system can be done in three ways: Confirming users' identities by a password, a key or other device such as a smart card, or a physical action or trait.

Biometric security devices examine the physical actions or traits that make each individual unique. There are six types of devices currently available and at least two more under development.

They work in a similar manner: A biometric portrait of the subject is scanned or read by sensor devices, converted into digital data and stored. In verification, the subject's handprint, voice or other trait is compared with the stored profile.

- The back of a person's eyeball contains tiny blood vessels arranged in patterns that are as unique as fingerprints. Retina scanners read the size, location and pattern of blood vessels in the back of the eye.
- Forgers can mimic the appearance of a signature, but a biometric pen or pad measures signature dynamics: the pressure exerted by the writer on the pen point and the motion used in writing, for example.
- Keystroke analysis compares the individual patterns and rhythms of typing repetitive character groups.
- Hand geometry systems measure finger length, skin translucency and palm thickness and shape, among other characteristics.
- Even junior criminologists know that no two fingerprints are identical. Fingerprint or thumbprint identification systems analyze the unique arches, loops and whorls of a person's finger or thumb.
- Voice verification maps the actual physiology that produces speech, not merely sounds or pronunciation.

Under development are two other biometric methods — one that makes use of neural network technology in a device that aims to recognize faces and another that analyzes a person's genetic pattern, or "DNA fingerprint."

MICHAEL ALEXANDER



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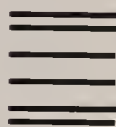
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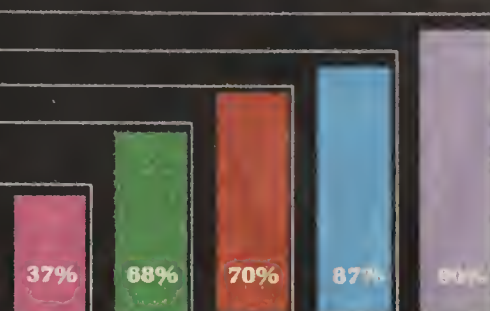
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## EDITORIAL

## Common cents

**I**N RECENT MONTHS, we've devoted considerable space to the phenomenon called outsourcing, and this week's Executive Report adds a few more bars to the rising chorus of debate over the pros and cons of this trend.

To this point, there appears to be a consensus on at least a few points in the debate, although the jury will be sequestered for some time on the real meaty issues.

The points of agreement: Does outsourcing save money? Yes, without question — initially. As one IS executive told us, the typical sales pitch from outsourcing vendors is, "Whatever you are paying for DP and other information services, we can do it for less. Sign here."

The second point of agreement emerges largely as a result of the first — that the number of companies choosing to outsource all or part of their IS operations will grow, perhaps aggressively, throughout the early 1990s.

The third point of agreement, also related to the first, is that a lot of non-IS senior executives think outsourcing is just a peachy idea.

And finally, the majority (though not all) of companies that have aggressively embraced outsourcing were on shaky financial footing to begin with.

So if there is a common thread to the points of consensus, it is money, pure and simple. Savings can be realized in very short order, and that fact plays well in a corporate culture caught up in the quarter-to-quarter existence dictated by Wall Street.

However, the issue that should be addressed first and foremost when considering outsourcing is the matter of just what a company wants and expects from its IS resources in the long term.

Last year, an exclusive *Computerworld* survey of over 100 CEO-level executives found that a clear majority believed that information systems holds the key to competitive advantage in the 1990s. That position would have been accorded to engineering and manufacturing in the 1960s and to sales and marketing in the '70s and '80s. How much consideration was given to outsourcing those functions in any great measure? You know the answer.

What made these functions different from IS, at least in the eyes of senior management? For one thing, IS remains a mystery to most senior executives, who accept that it is vital to competitiveness without really knowing how to harness its potential.

However, the biggest problem has been with IS itself and its failure to show management it can be as flexible to meet changing business needs as engineering, manufacturing and marketing were. There are now tools available to help IS operations become flexible; it is the human element that has lagged.

Thus, while a limited amount of outsourcing certainly makes sound sense, it is likely that a lot more will take place than is really justified and beneficial for the longer term. That is where we find the hidden costs of outsourcing.



## LETTERS TO THE EDITOR

## Ada at a time

I was with the Army Institute for Research in Management Information & Computer Sciences in the early 1980s when Ada became a major concern in the defense industry. I have to take some exceptions with John Barnes' Viewpoint, "Don't underestimate the importance of Ada" [CW, Oct. 16]. It ignored published reports, history and computer language technology to come to a picture of a bright future for Ada.

How many Jovial programmers do you know? This is a language that was pushed by the defense establishment. It is a well-structured language in the Algol family and was far ahead of the other languages of its day. It has about the power of a Pascal with extensions for systems work. Jovial failed to catch on despite having more going for it in its day than Ada does today.

How many PL/1 programmers do you know? It also has generic abilities and tasking, but PL/1 failed to catch on in spite of having IBM behind it.

Your contention that Ada software is likely to be superior is not supported by actual studies. The U.S. Government Accounting Office recently reported that it can attribute no cost savings to Ada. But I did find that longer design time leads to better systems, regardless of the language used. In short, no language can protect you from bad design.

Other government studies have shown that Ada real-time systems have embedded assembly language kernels for speed and proper task control. Real-time systems written in Occam, Forth or C do not have to resort to embedded assembly language,

except in special device driver routines. They are therefore easier to maintain than Ada programs. A horrible situation, since Ada was supposed to be designed for "mission-critical software" support.

While Ada compilers were still being developed, Pascal, Modula-2 (often called "Ada done right") and other languages made big gains. They offered structure, data typing, packages, better task control and most of the useful features that Ada had without the slowness, huge size and lack of platforms. It is not just the lack of experience of Ada programmers that made contractors seek waivers from using Ada; it is the availability of better tools for the job.

One story I was told recently concerned an Army spokesperson addressing a group of software developers with this closing remark: "You have to show us that you really want Ada by developing more software with it!" The developers sat there muttering that they didn't really want Ada unless they had a gun to their heads.

Barnes speaks of what Ada might be able to do someday. I am concerned with what is happening now.

Joe Celko  
Los Angeles

## Japan look

I am writing in response to John P. Adams' letter concerning Sabrina Skulsky's Viewpoint, "What I learned at IBM-Japan" [CW, Oct. 16]. I thought his comments were despicable.

Not only did Skulsky look at the experience from her perspective, but she also put it in the American, Japanese, family and

personal context as well. It is not often you read computer professionals who look past the immediate situation and place events and circumstances in their broader context.

I particularly enjoyed her insight on family values. In our society, which demands so much, she was right on in stating the negatives to adopting Japan's business style in order to compete. Some of our greatest advances have come from men and women who were extremely devoted to their families. It is from this that they derived some of their greatest strengths, morally and otherwise. It is particularly important in the stressful DP environment. Having been in this field over 14 years, I've seen what it can do to marriages.

William F. Clark  
Amdahl Corp.  
Columbia, Md.

## End bias

Carl Shusterman left something out when he wrote of the immigration reform necessary if the U.S. wishes to look abroad to fill its growing high-tech labor shortage. This country has got to stop discriminating on the basis of sexual orientation in its immigration policy or it will continue to pass up the skills and talents of a large number of brilliant and gifted technicians.

Marianne Seggerman  
Senior Programmer Analyst  
Stamford, Conn.

*Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*



# Challenges of unmet promises

JIM MANZI



It seems an act of divine intervention that the decade just concluded will be remembered not by its first nine years but rather by its last nine weeks. When historians reflect on the 1980s, they will be drawn to this decade's punctuation mark — the unraveling of totalitarianism and the liberation of the people of Eastern Europe.

From one vantage point, these events can be viewed as the triumph of free information. It is now a time when information no longer respects national boundaries.

As we further reflect on the past decade and look beyond mere images, the 1980s will be defined as the dawning of the information age, an era when computers moved from the laboratory to the lap and satellite dishes made their way from radar stations to rooftops, providing Americans and others around the world almost instantaneous access to information.

Today, tens of millions of computers populate a world that a decade ago could count these machines in the thousands. It is this explosion of information

Manzi is president and chief executive officer of Lotus Development Corp. in Cambridge, Mass.

power that is helping change the world's economic and political landscape.

In 1983, when Mitchell Kapor and Jonathan Sachs first brought Lotus' 1-2-3 to market, no one imagined that this software would ignite the personal computer revolution.

Seven years later, Lotus can count almost 10 million customers in more than 70 nations, each having access to a new, common language of global business.

In many instances, this access has enhanced productivity — the promise of the revolution. In many others, it has left people overwhelmed by a surfeit of facts and figures that they neither have the time nor the inclination to comprehend.

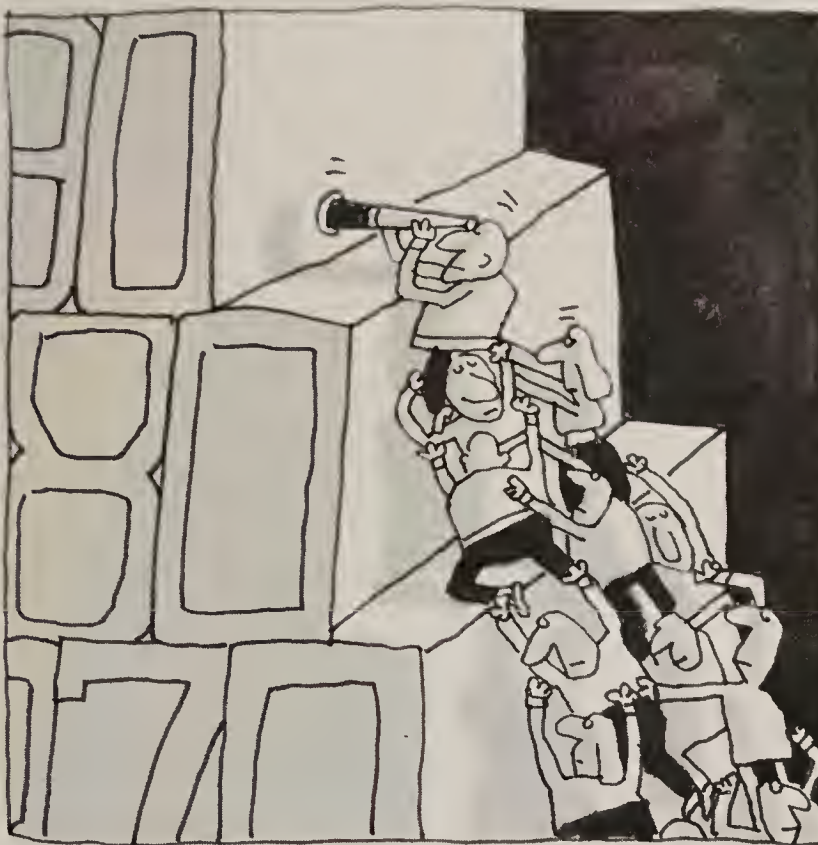
As one writer stated recently, "One of the great ironies of the information age is that as the technology of delivering information becomes more sophisticated, the possibility that we can process it becomes more remote."

So we now have more information, but not necessarily any greater understanding of the world around us. This is one of the unmet promises of information technology, and it is one that we — and other companies like us — plan to meet in the 1990s.

Another challenge for PC hardware and software suppliers in the 1990s will be meeting the service requirements of our customers who are attempting to

take maximum advantage of the advances in hardware and software that have occurred in the past 10 years.

Service, rather than raw technology, will drive the next cycle of growth in the PC industry. We have given our custom-



NICULAE ASCIU

ers tremendous raw processing power and hundreds of new applications that attempt to harness that power. We now must recognize that there is a great need to provide the support offerings that will help our custom-

ers achieve the highest payback from the technology we've provided them.

Another challenge of the 1990s will be meeting the advances of foreign competitors, particularly the Japanese.

Unlike the automobile industry, software companies did not face stiff competition from the Japanese in the 1980s. But we cannot afford to be complacent

and convince ourselves that software technology is the only computing technology that will elude the grasp of the Japanese.

Some say the Japanese lack the individual creativity for developing good software. This is

nonsense. In the 1970s, some said the Japanese could not build cars that would sell in the U.S.

The Japanese are no longer confined to capital- or manufacturing-intensive industries. Recent data suggests that the Japanese in 1988 began spending more on research and development than on capital investment for the first time in history.

Creativity — called *soozoo* — is now Japan's corporate battle cry. Matsushita executives sport badges saying "Create!" In many firms "innovation groups" have replaced "quality circles."

A significant portion of the U.S. economy is based on information industry companies such as Lotus. The members of this sector must act cohesively but, at the same time, remember that global competitive battles are not fought industry vs. industry but rather company vs. company. We must compete aggressively and not retreat into an era of techno-nationalism, nor should we abandon our commitment to free markets.

As the decade's end approached, I was often asked if the PC revolution is over or whether it has just begun.

My answer is similar to the close of Philip Roth's novel, *Portnoy's Complaint*.

After Portnoy recounts the story of his life for nearly 300 pages, in the very last line of the book his psychiatrist finally speaks up and says, "So, now vee may perhaps to begin. Yes?"

Begin, indeed. Welcome to the 1990s.

## X-terminal marks the spot for PC functionality, cost

STEPHEN SMITH



Terminals have a bad name. They symbolize everything that is wrong with "old-style" computing. Today, everyone wants a personal computer. But imagine if you could get the functionality found in today's high-end PCs (plus more) for the price of a dumb terminal (under \$1,000). That is the design goal of the X-terminal, perhaps the most important development in desktop computing since the PC.

Cost is the primary factor in the design of an X-terminal. It is intelligent, based upon microprocessor technology, and designed to run an Apple Macintosh-like, high-resolution windowing user interface. It has a mouse and a large (up to two-page), bit-mapped display. It also

Smith is first vice-president of research at Paine Webber, Inc. in New York.

has strong graphics capabilities. Networking hardware and software are built in.

A user can be entering data into a DOS application in one window while logged onto a Unix system in another and accessing information from an IBM mainframe in a third. But like a dumb terminal, an X-terminal is small, quiet and inexpensive.

### A different ball game

Yet an X-terminal is not a PC, nor is it a "diskless workstation." It doesn't do applications processing within the device itself. It doesn't run DOS, Unix or any other operating system. The power of the device is used to run X Window System and also to provide extensive networking support. By offloading to servers within the network all but the elements necessary to communicate with and display the output of computers within the network, X-terminals can deliver the maximum amount of functionality on the desktop for the lowest cost per seat. X-terminals

don't need the expensive memory, controllers, expansion slots and drives found in full-line workstations.

Let's face it. We are already way over—"MIPSeD." Most PCs are used only a few hours each day. Think of all that idle capacity. Is running Lotus' 1-2-3 a tiny bit faster a good justification for putting the power of a mainframe on everyone's desk? But at the same time, it is a reality that you need the power of a 386-based PC to run Windows. Apple, IBM, Microsoft and Next are all likely to agree on one thing — Windows (in its generic sense) is the hottest thing to hit the PC market since 1-2-3. Why? Because it makes PCs so much easier to use. I believe that the move from text-based to graphical user interfaces such as Windows is the primary force behind users upgrading their computer hardware today.

But think of the cost. Take a 386-based PC, add high-resolution graphics, an advanced windowing scheme such as Microsoft's Windows or Presentation Manager, a lot of memory, big disks and a networking card. We're talking big bucks, especially if we are talking about putting one on everyone's desk.

Cost per seat? Probably \$5,000 to \$7,000.

Is all that really necessary? We are now at the stage where the amount of money spent on dedicated PCs and powerful workstations is becoming a major concern for many corporations. So instead of buying 386s for everyone, why not buy a few 486-based servers and give everyone X-terminals?

### New in town

X-terminals and X Window have only recently come on the scene. Only 10,000 to 15,000 specialized X-terminal units are projected to ship this year. I expect market leaders in this area to push the entry price down significantly over the next two years (toward the \$1,000 level) and to extend upward into color versions. Among the majors, NCR and Hewlett-Packard have already introduced their first X-terminal products. DEC and IBM are also likely to make a push in the next few months.

X Window is attracting the attention of more software developers today than OS/2 and Presentation Manager. Unlike other alternatives, X Window is open, can be added incrementally to your existing systems and runs

on IBM PCs and Unix workstations as well as on low cost X-terminals.

Both sides of the Unix war have endorsed X Window. DEC has completely endorsed X Window as the single interface for its VMS, Ultrix and DOS products. HP is moving New Wave to X Window. Even the Macintosh may be brought into the fold as part of the Apple/DEC joint effort. Perhaps most important, the Open Software Foundation will likely soon choose a Macintosh-like desktop manager for X Window. So, what does all this mean for you, the computer buyer? X Window represents a breakthrough in the accessibility of information. While you can run X Window on a fancy workstation or PC if you want to, X-terminals offer to deliver that capability for not much more than the cost of a dumb terminal.

Is all this for real? This is a complex problem. X Window and X-terminals are not going to revolutionize the world overnight. For once, however, things are moving quickly. While there is much confusion in the area of PC operating systems and user interfaces, most major systems vendors have endorsed X Window. It is truly an open standard.



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## S O F T T A L K

Howard Fosdick

### Standard Dialog



IBM's Systems Application Architecture (SAA) has brought order to a confused world. Among

other things, it defines standards for programming languages and interfaces. This is a tremendous boon for information systems managers, who now enjoy clear-cut direction from IBM concerning software standards. Unfortunately, one of those standards causes concern among mainframe users: the dialogue interface.

The dialogue interface defines the appearance of textually oriented screens. It modernizes and standardizes these screens under the banner of SAA's Common User Access (CUA). Using the dialogue interface eliminates the expense of purchasing high-end IBM Personal System/2 workstations, which are required for the more advanced CUA graphical interface (i.e., Presentation Manager).

To hear IBM tell it, the SAA Dialog Manager is based on two preceding products: the ISPF

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- NASA shuttle's VAX scheduled for a 'shakedown' cruise. Page 25.
- Fabric firm faces '90s with Unisys package. Page 26.

## CASE standard comes overseas for Unix arena

*Development framework interests DEC, IBM*

### ANALYSIS

BY AMY CORTESE  
CW STAFF

Relief from the pain of complex software development may be at hand not only in technical computing but in commercial applications as well.

Interest from IBM and Digital Equipment Corp. and the increasing complexity of development projects are combining to push Integrated Project Support Environments (IPSE) beyond niches in technical markets such as aerospace and defense.

IPSE, a common term in Europe for a decade now, is an inte-

gration framework for building and managing large-scale software development environments. The framework typically consists of a repository and an interface into the repository. It also includes repository services such as configuration control and user environment services.

Both IBM and Digital Equipment Corp. have been actively investigating IPSEs, most immediately for their technical computing strategies but potentially for commercial computer-aided software engineering (CASE) strategies as well. At the center of this activity is Atherton Technology, Inc., a small IPSE vendor in Sunnyvale, Calif.

DEC teamed up with Atherton to develop an IPSE interface dubbed ATIS, for A Tool Integration Standard. DEC plans to incorporate that standard into the next release of its Common Data Dictionary Plus repository for VAX/VMS. "That gives us the last major piece of the environment that makes what we do IPSE," said Geoff Roach, a marketing executive with Digital Equipment Corp.

Moreover, IBM just two months ago quietly entered into its own agreement with Atherton to bring that firm's Software Backplane IPSE to AIX, IBM's Unix variant. While terms of the agreement were not disclosed, the Atherton software is likely to play a significant role in IBM's AIX CASE strategy.

Alan Codkind, vice-president of marketing at Atherton and a former IBM executive himself, said that IBM is participating with DEC, Atherton and others in the latest revision of the

evolving interface, which will be ready within the next year. A standard ATIS, Codkind said, would mean that third-party development tools written to it would run against any repository using the interface. "It's an indication that you can have an open systems environment with a proprietary twist," Codkind said.

Current Atherton and DEC customers use the Software Backplane, not CDD Plus, as the repository, Codkind maintained. Likewise, he said, the Software Backplane provides IBM AIX users with a repository strategy.

*Continued on page 28*

### Ceilingless

*The number of Unix systems installed will almost triple by 1992*



SOURCE: INTERNATIONAL DATA CORP. CW CHART: JOHN YORK

## Dearth of tools stunts Unix growth

BY J. A. SAVAGE  
CW STAFF

As Unix-based computers achieve higher performance levels — and higher costs — capacity planners have little idea how to justify their purchase to management, in part because of a shortage of tools to feed them the necessary information.

There is a lack of basic evaluation tools to produce data that shows what equipment is needed or not needed, said Marcus Janoski, a capacity planner at Pacific Bell in San Ramon, Calif. He was one of several managers who cited the shortage of Unix tools while attending last month's Computer Measurement Group conference in Reno, Nev.

"We're being asked to forecast at a level where decisions are being made. We want to have

the tools to answer management's questions," said Mary Sue Williams, a systems engineer at Chemical Abstract Service in Columbus, Ohio. "We're getting the credibility; now we need something to base it on."

#### Meeting needs

A few vendors are offering what they claim will answer Unix users' planning needs — remote terminal emulators that simulate a day's work for a system.

"In the mainframe arena, there are a whole series of expensive capacity planning tools — so [users] don't scream," said Neal Nelson, president of consultancy Neal Nelson & Associates. "The Unix people are screaming because they don't think they have the tools."

Nelson and a few others, like AT&T, are just beginning to of-

fer remote terminal emulators. The benchmark group System Performance Evaluation Cooperative (SPEC) is also planning to add remote terminal emulation benchmarks in its performance measuring suite.

However, Unix planners say the emulators are not enough. "In [the IBM] MVS environment, there is a rich set of diagnostics I can run. In the Unix environment, I can't even collect core dumps," said Michael Covert, senior computer systems specialist at Chemical Abstract. Covert said he is looking for an integrated set of tools from the vendors of his computers, not from a third party.

The scattering of Unix ports and the interminable quest for a standard Unix only increases the pain of developing evaluation software. While firms could cus-

tomize an MVS product, for instance, they are torn between putting the time and money into that now and the promise of standards on the horizon.

"What frightens me is [that] we will write a layer of code that we can't get rid of — it will have cost us too much money already," Covert said.

Vendors such as Hewlett-Packard Co. say they sympathize but are stymied by the lack of a standard. Users say they cannot wait.

"We're six years into 'production Unix,' and we have critical applications that have to be made now," Covert said.

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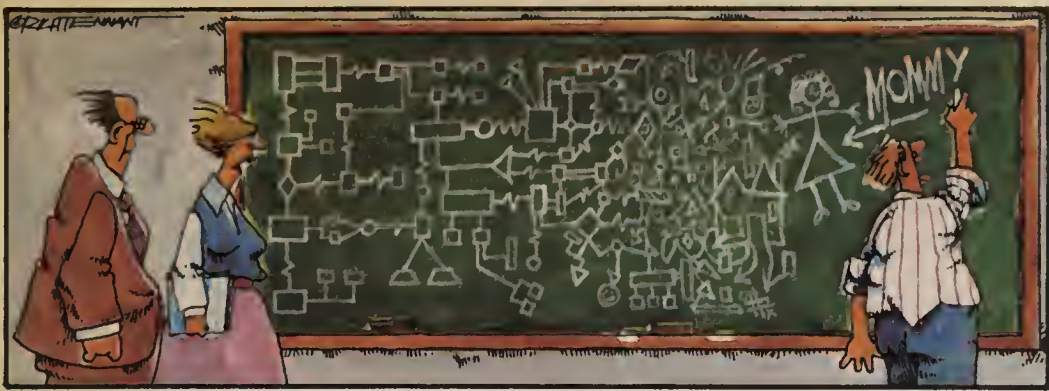
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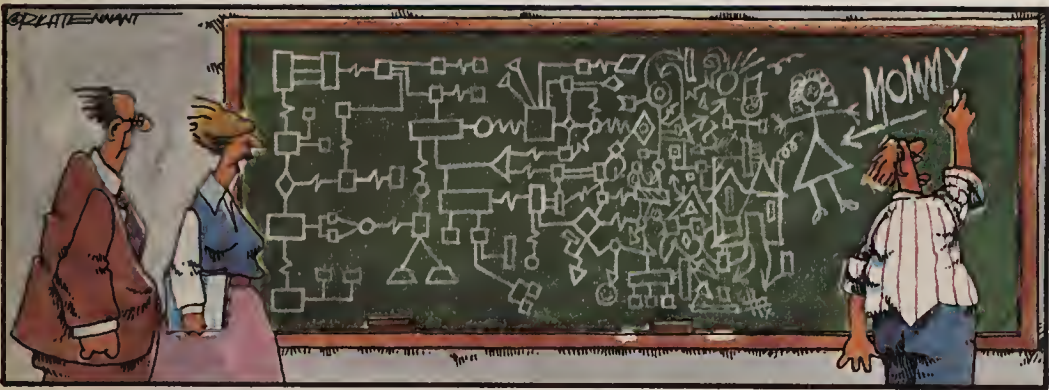
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# Plotting war games with Ingres

## ON SITE

BY MITCH BETTS  
CW STAFF

WASHINGTON, D.C. — Tom Clancy, author of such best-selling techno-thrillers as *The Hunt for Red October*, may have been picking up some tips for his next book when he recently visited defense contractor Syscon Corp. and got a peek at the latest technology in war games.

Clancy, known for plotting some pretty intricate military scenarios himself, saw Syscon's demonstration of the computer-assisted war game simulations used by the Joint Chiefs of Staff. For example, the State of the Art

combat effectiveness, supplies, equipment capabilities, logistics, weather and terrain.

Tucked away in Georgetown, Syscon's Center for Modeling, Simulation and Gaming develops software that helps the military create new scenarios, manage the data during the game and analyze the results.

Syscon builds many of its data management applications using the Ingres relational database management system from Alameda, Calif.-based Ingres Corp., according to Linda A. Vitella, the center's database task leader. It runs on Syscon's Digital Equipment Corp. VAX 8650 under VMS.

For example, Vitella is using

mander may want to display all units currently engaged in combat.

Four years ago, data management was a big problem for the Syscon war-game center because the data was kept in flat files. Vitella said that the move to a relational DBMS has provided a logical structure for the data imported from military data sources; the ability to verify the data elements and their relationships; more user-friendly queries and reports; and faster development of scenarios.

"Once data is in a database that is logically organized, you can make judgments about your scenario — even before you do the war game — because you can look at it from different perspectives," she said.

Vitella said Syscon currently uses Ingres Release 6.2 but was a beta-test site for Release 6.3 and is eager to upgrade to 6.3 once it is approved by Syscon's military sponsors.

Release 6.3, which Ingres calls the Intelligent Database, improves the core database engine with an Intelligent Query Optimizer and adds two modules: the rules-based Knowledge Manager and Object Manager, which allows users to define new data types [CW, Nov. 13].

Vitella praised all three major enhancements, especially the Knowledge Manager, which can place resource consumption limits on user queries to prevent so-called runaway queries. She called that "a fabulous thing, especially if you have users dumping huge tables. We've had people run queries that ran all weekend, sometimes because they made an error."

In addition, Vitella welcomed a Knowledge Manager feature that allows programmers to insert rules into the database that

will automatically trigger other actions. But she said she would like Ingres to go further and introduce a code generator for building applications programs.

"I think we write too much code, and I'd like to see some sort of code generator. I've told them that, and they've said

they're fixing it," Vitella said.

Meanwhile, Vitella said a major goal at the Syscon center is to make the computer technology easier for military analysts to use by employing well-organized function keys, pull-down menus, pop-up windows and, in the future, interactive graphics.

## NASA puts VAX through paces for space flight

BY MARYFRAN JOHNSON  
CW STAFF

GREENBELT, Md. — Learning to shake, rattle and roll with the other scientific gear aboard an upcoming space shuttle flight is the first order of business this month for a Digital Equipment Corp. VAX computer.

At the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center, a militarized version of the VAX 6000 will undergo environmental and vibration testing during the next few weeks to prepare for the shuttle launch in November.

Equipped with a 350M-byte erasable optical disc, the VAX will run high-tech experiments involving robots back on Earth. But more importantly for the scientific community, it will run standard VMS software — making it the first space-borne general-purpose computer.

The VAX will fly as part of NASA's Hitchhiker program, which allows various agency departments to grab some shuttle floor space and borrow some communications bandwidth to conduct their own experiments.

"Software developed on the ground will be identical to that running on the machine in flight," said David Provost, head of the Robotics Data Systems

and Integration Section at NASA. "In the past, you had to convert and customize the software at tremendous cost."

The space VAX project is a joint effort between NASA, DEC and Raytheon Corp., which helped NASA turn a combat-prepped VAX into a machine that could withstand the rigors of space flight.

"The leap to aerospace was relatively simple," Provost said.

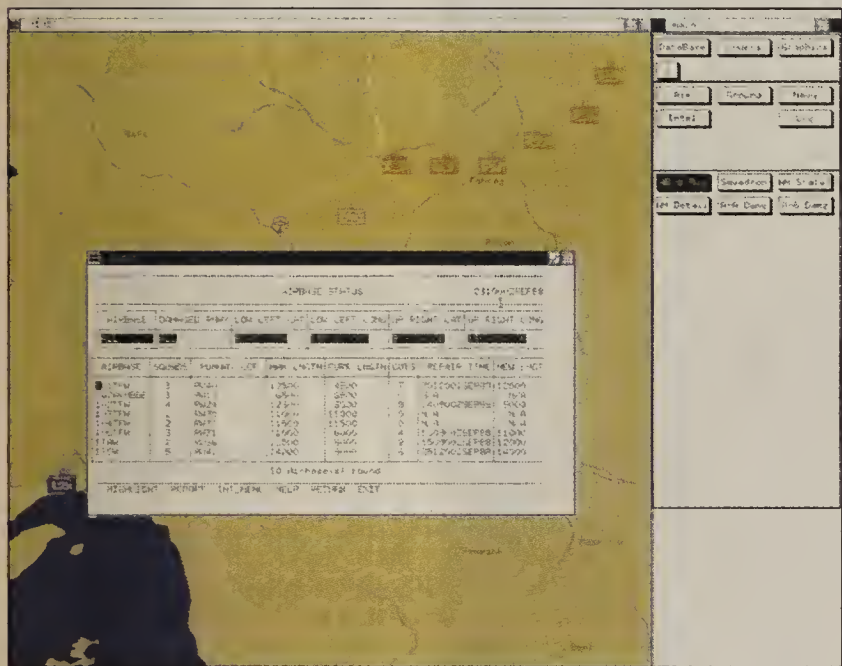
**T**HE VAX WILL run high-tech experiments involving robots.

"If it can ride in a tank, it can ride in a shuttle."

NASA's VAX 6000 will be a "full-fledged VAX," configured with more than one CPU, memory boards and a number of standard communications interfaces, Provost said. Eventually joining the VAX in space will be an IBM-compatible personal computer based on the Intel Corp. 80386, he added.

A space-borne general-purpose computer holds great allure for scientists and university researchers because VAXs and

*Continued on page 27*



Ingres helps provide updates on the field of play in war games

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The highly complex models used by military planners must process nearly 1M byte of data representing military forces,

Ingres to develop an information management terminal that will allow war-game players to manage real-time data and message traffic during the game and query the database. A U.S. Air Force player may want a list of all squadrons that are grounded due to insufficient runways, for instance, or the ground com-

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# Snipping away the systems of the '60s

## ON SITE

BY ROSEMARY HAMILTON  
CW STAFF

DYERSBURG, Tenn. — With a new system and software from Unisys Corp., Dyersburg Fab-

rics, Inc. is hoping to finally leave the 1960s behind.

The company, a fleece fabric manufacturer, recently launched a software overhaul project that will put to rest an assortment of old Cobol programs and replace them with an integrated set of

applications that were written in Unisys' fourth-generation language, Linc.

The rewrite project is scheduled to take two years. Driving the effort will be a new Unisys A12 mainframe. The firm upgraded from an A9 in late 1989.

Most of the software programs date back to 1966 and were written in an advanced assembler language for the early Burroughs Corp. mainframes. The software was then converted to Cobol and has been modified over the past 20 years.

According to Bill Cloar, vice-president of data processing, it was not that the old software no longer worked but just that each piece functioned separately.

The only way to move data from one program to another was to wait for a batch run to be completed and then move the data over, he said.

The objective with the Linc software is to create a company-wide system that allows data to be swapped back and forth in real time. The staff will keep only a few of the old Cobol accounting applications. The plan is to write interfaces from the Linc environment to this software.

Cloar said he picked Linc because his staff has been using it on selected projects since 1983. Linc allowed the staff to put together a prototype of an application quickly and then get feed-

**“W**E’VE BEEN using Linc, but we’ve misused it. We just did individual applications. You’re supposed to use it to get a corporate view.”

BILL CLOAR  
DYERSBURG FABRICS

back on it, he said. Changes could then be made to the application in the early stages.

“You can do system design at a much higher level,” Cloar said. “You cut out a lot of steps. You can build in a hurry and have users involved in the design and see in a hurry what it’s going to look like.”

Cloar said the software is now being used to create an overview of the entire software environment and how each component will relate to others.

“We’ve been using Linc, but we’ve misused it,” he said. “We just did individual applications. You’re supposed to use it to get a corporate view.”

The current top priority is a warehouse management application, which is scheduled to be online by April 1. The software will automate the various inventory and shipment jobs associated with the warehouse.

So far, both the new A12 mainframe and the initial software development are going smoothly, Cloar said. He claims to be an old hand at upgrading Unisys’ hardware. In fact, Dyersburg Fabrics has never done business with another vendor.

“In the early years, we looked heavily at IBM, and at the time we decided we really liked the way Burroughs worked,” he said. “Converting would be a hard thing to do now. When you’re committed to a vendor and tied into their proprietary stuff, it’s hard to change.”

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# ASC rescues source code

BY ELLIS BOOKER  
CW STAFF

SCHAUMBURG, Ill. — Accidents will happen. And when they involve deleting source code that has no backup, a tiny company called Advanced Systems Concepts says it can help.

For 90 cents a line, ASC will reconstruct source code for the IBM System/38 or Application System/400 from existing object code. The software vendor added AS/400 recovery to its existing System/38 service a few months ago and claims that it is alone in the market with this kind of recovery offering for the IBM midrange.

"They're a lifesaver for us," said Judi Dore, manager of information systems support at Quebec and Ontario Paper Co. in Saint Catharines, Ont.

In Dore's case, the problem was a disk crash three years ago on the firm's System/38. The disk contained one library

**A** SC WILL reconstruct source code for the IBM System/38 or Application System/400 from existing object code. The software vendor added AS/400 recovery to its existing System/38 service a few months ago.

with "600 to 700 programs that hadn't been backed up to tape," Dore recalled. The paper company sent ASC its object code tapes and in return has received the source code for about 50 programs to date from the lost library.

A recent AS/400 customer is Freymiller Trucking, Inc., which last month discovered that the source code for some programs on its year-old IBM AS/400 B60 would not execute. The problem came to light after reprogramming work performed by an outside, and no-longer-used, systems integrator.

"I sent [ASC] a diskette with full libraries and within a week got it back with the object and source [code] for all the libraries," said Nicholas Kegler, senior programmer analyst at the Bakersfield, Calif., firm. Total cost for the recovery was \$1,600.

ASC was founded in 1982 by Ken Kelley and Ira Cohen, who left Professional Computer Resources shortly before its acquisition by Lisle, Ill.-based Pansophic Systems, Inc.

With just 10 professional employees, ASC has posted impressive revenue gains in the last three years, growing from \$1.2 million in 1987 to an estimated \$3.8 million this year. The company projects it will hit \$5.6 million in revenue next year.

According to the company, the recovery service is only part of its total product line, which includes Sequel, which it calls the "first and only" SQL implementation for the IBM System/38, and Abstract/Probe, an automated documentation package for applications programmers.

## NASA

CONTINUED FROM PAGE 25

VMS software are so widely used in those communities, Provost explained.

"We can look at doing things in space that allow preprocessing in space, so the computer is only sending back data with the correct answer," he said. "We'll get tremendous productivity from scientific instruments and experiments. It will be more science for the dollar, basically."

Along with qualifying the VAX for space flight, Provost will analyze the effects of the two-second time delay between a computer-generated command from the shuttle and his robot's response in the lab.

If the robots perform their tasks safely and accurately, they would eventually be controlled in space flight from a ground-based computer.

Harvey Weiss, vice-president of DEC's government systems group, said the modified VAX will be the "most powerful computer ever used in space exploration by NASA."

True enough, Provost agreed, but he pointed out that the space agency is well-known for its use of aging, highly specialized computers.

"Up until now, it was so difficult to flight-qualify a machine," he said. "It was hard to make them capable of surviving all the rigorous conditions in space. Raytheon took care of that by ruggedizing the VAX for military use."

## Fosdick

CONTINUED FROM PAGE 23

Dialog Manager, a mainframe product that runs under MVS, VM and VSE, and the EZ-VU Development Facility, a PC-DOS product inspired by the ISPF Dialog Manager.

However, analyzing the SAA dialogue interface shows that it is, in reality, almost wholly derived from the EZ-VU product. The SAA Dialog Manager has little in common with the mainframe-based ISPF Dialog Manager.

To quantify these differences, the SAA dialogue interface offers a dozen services callable from application programs. These services aid application



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programmers in developing "dialogues," structured interactions between their programs and users. Specifically, the services support dialogue initiation and termination, screen handling and variable handling.

The SAA Dialog Manager services represent the merest fraction of the 80-odd services that ISPF Dialog Manager provides to mainframe programmers. The SAA definition omits entire categories of ISPF Dialog Manager services. These include file tailoring, which is the ability to automatically alter files from programs with variable substitution, single call access to the ISPF/PDF editor — a key reason many shops use ISPF Dialog Manager, log and list services essential to auditing and debugging, library ac-

cess services that help in control of datasets and table services.

The SAA dialogue interface is not a new form of ISPF Dialog Manager. Instead, it is a functionally limited subset that retains little beyond screen and variable services. Not only that, but the syntax for invoking services differs between the ISPF and SAA Dialog Managers.

The bottom line is that the SAA Dialog Manager does not provide forward compatibility with the ISPF Dialog Manager.

Is this a problem? You bet. The ISPF Dialog Manager has been used in IBM mainframe shops for almost a decade, and numerous applications depend on this product. ISPF has been especially popular because of its tight integration with

the ISPF/PDF development environment.

The result has been that over the past several years the ISPF Dialog Manager has become equal with CICS and IMS/DC as a premier production teleprocessing monitor. A recent study of several hundred companies substantiated that there is a major trend toward ISPF programming in the database world.

In its last two releases, IBM has included new SAA features in the ISPF Dialog Manager. For example, the product now has services to add or remove pop-up windows and a conversion utility that permits ISPF developers to define their screens in the SAA panel-description language. These new features help ISPF programmers build applications that em-

body CUA characteristics. However, it does not mean that ISPF Dialog Manager programs conform to the new SAA dialogue interface standard. Will IBM expand the current SAA dialogue interface definition to match ISPF's functionality? Users want compatibility; so far, IBM has talked conversion.

However, IBM does have another option. The company can declare the ISPF Dialog Manager an "SAA-participative" product, similar to the status it has accorded CICS and IMS/DC.

While "SAA-component" products will run on all SAA platforms, SAA-participative products communicate and exchange data with SAA components. This allows these products to participate in the evolving SAA environment without committing IBM to supporting them on all platforms.

For the three mainframe teleprocessing monitors, CICS, IMS/DC and ISPF Dialog Manager, this makes a lot of sense. It recognizes the predominance of these products in the marketplace and protects installations' investments in existing code.

At the same time, it concedes that these products have specific roles within SAA strictly as mainframe teleprocessing monitors.

In its SAA dialogue interface standard, IBM guarantees that programmer skills with the ISPF Dialog Manager will be applicable to the SAA Dialog Manager. Will it provide the same guarantee for users' code investments?

Fosdick is a consultant based in Villa Park, Ill. and the author of *Using IBM's ISPF Dialog Manager*.

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## CASE

CONTINUED FROM PAGE 23

Although he would not comment on either vendors' plans, Codkind hinted that announcements would be forthcoming from both IBM and DEC in 1990. Industry observers expect IBM to introduce its new AIX-based reduced instruction set computing systems along with comprehensive software offerings to be announced in early 1990.

IBM, traditionally more oriented toward the commercial marketplace, is relatively new to technical CASE. Jack Clemmons, manager of technical CASE marketing for IBM, said technical CASE is a multibillion-dollar market worldwide and represents a new business opportunity for IBM, whose presence today in that marketplace he acknowledged is small. "My charter is to get us into this business," Clemmons said.

But some maintain that IPSEs, considered essential for technical software development, hold promise for commercial development as well.

The technical market, which tends to develop massive software systems made up of hundreds of smaller components, has to make sure all those things come together, Roach said. As commercial applications grow increasingly complex, however, "sooner or later the commercial world will need it" as well, Roach maintained.

"In the old days, Unix meant technical CASE and SAA [Systems Application Architecture] meant commercial," Codkind said. But lately, he said, "the old lines are blurring. Today, it's more accurate to talk about Unix-based CASE."











## NEW PRODUCTS — SOFTWARE

**Database management systems**

Intex Solutions, Inc. has announced that its SQL:Attach Plus software package is now fully compatible with Xpedit from Centura Software. Both products were designed to enhance the IBM DB2 batch environment.

SQL:Attach Plus enables users to run DB2 applications in the batch mode outside of TSO and provides an SQL monitor and checkpoint restart capability. Xpedit allows programmers to test and debug programs under TSO.

License fees for SQL:Attach Plus are scaled according to CPU size and start at \$6,000.

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Mackinney Systems has announced a software package targeted for use by database administrators in a DOS/VSE environment.

SQLTMAN is an SQL/DS table manager that provides a "snapshot" view of the database and looks for problem areas as it is printing the listing. The package can print as many as six different reports based on criteria such as tables, views, options, programs or users.

It costs \$995, and an annual lease is available for \$395.

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**Applications packages**

Data Retrieval Corp. has announced Textlaw, a litigation support application for IBM MVS/CICS and Digital Equipment Corp. VAX/VMS platforms.

Based on the company's text management tools, the software incorporates a full text database management system as well as several retrieval functions and allows users to research, track, modify and update pending legal documents.

Pricing starts at \$14,625 and varies depending on system type and number of users.

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Stockholder Systems, Inc. has announced PEP, its paperless-entry-processing electronic funds transfer software, for the IBM Application System/400 midrange computer.

PEP offers a variety of cash management functions, including cash concentration, direct deposit and preauthorized debit origination. It also manages electronic data interchange services.

Introductory pricing has been set at \$9,500.

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404-441-3387

Access Technology, Inc. has released two products: Version 2.3 of 20/20, its integrated spreadsheet software package,

and the 20/20 Database Connection.

According to the company, both programs have been designed for use on NCR Corp.'s Tower family of AT&T Unix-based computers. The revised spreadsheet includes an integrated auditor function, and its price ranges from \$950 to \$6,800.

The database package has been designed as a transparent bridge between 20/20 and Informix databases. Prices range from \$280 to \$2,720.

**Access Technology**  
2 Natick Executive Park  
Natick, Mass. 01760  
508-655-9191

**Utilities**

Raxco Software, Inc. has announced Version 4.3 of the Rabbit-1 Resource and Accounting/Chargeback System.

The software package now includes automated summary reports and menus designed to simplify setup procedures, according to the company. The program tracks system resource consumption in a Digital Equipment Corp. VAX/VMS environment.

Prices range from \$2,495 to \$8,995, depending on VAX configuration.

**Raxco**  
Suite 200  
2440 Research Blvd.  
Rockville, Md. 20850  
301-258-2620

UIS has enhanced its file storage and retrieval system designed for the Digital Equipment Corp. VAX/VMS platform.

According to the company, V-X Archive allows system managers to move critical data off-line to safeguard it against loss or damage.

Version 4.0 supports file-structured devices, including optical disc, in addition to tape devices such as VHS tape and streaming cartridge, according to the vendor.

V-X Archive is priced from \$900 for a DEC Microvax II system to \$12,000 for the DEC 6400 series machines.

**UIS**  
420 Bedford St.  
Lexington, Mass. 02173  
617-861-6262

## Why Experienced Computer Users Don't Think Very Much About Modems

Our research shows that knowledgeable MIS managers, PC coordinators, and end users simply don't want to think of modems at all.

Not exactly what modem makers relish hearing! But it's hardly surprising that you want to save your thinking for bigger and more important things.

Modems are a lot like plumbing. As long as the data is flowing, they're practically invisible. However, when something goes wrong, those little boxes are just lavished with attention.

By then, you've lost data, time, money, and perhaps an opportunity. Both senders and receivers are dismayed and disarrayed.

Fortunately, there are simple ways to limit this aggravation. Our research suggests a few points to keep in mind.

### The cost of the modem is not the modem's cost.

The fixed price of the modem is relatively insignificant. Ongoing costs matter far more.

In the long run, for example, a high-speed modem can save you a small fortune on phone bills. More data sent in less time means less money to the phone company.

You can also save with more reliable and robust modems that communicate over a wide range of telephone line conditions.

Resending data costs both time and money. The less time you spend transmitting data, the more time you have to spend on your business.

Downtime and adaptation time can also cost you dearly.

Be sure to ask if the modems are compatible with their earlier generations. You don't want to start with suppliers who regularly obsolete their own products, or who don't offer you an upgrade path.

### Modem support can be a real hassle with the wrong vendor.

Setting up and installing your modem can affect both your budget and your sanity. Many manufacturers forget to make their modems easy to use!

This becomes expensive when you want to start up fast or need to support a large number of users.

Dip switches, on-line help screens, and easy-to-use manuals should be demanded. It also helps to have a quick-reference guide printed on the bottom of the case.

In sticky situations, it's vital to have toll-free support and applications engineering.

### Bottom line: The data must get through.

A bit of data traveling from your computer is converted by your modem and sent to your local telephone office.

From there, it is exposed to the vagaries of phone lines, various transmission media, and weather patterns.

They all conspire to corrupt your data and slow down your throughput.

All modems are not created equal; some are less sensitive to noise and have better error-correcting protocols.

Some are simply more robust and have better filters.

Modems are more than mere commodities — technology does count.

### "When things go wrong, I want the supplier there."

That's when you need the *right* supplier on board. Look for one who gives fast turnaround time on repairs and adjustments, and who doesn't vanish after the sale.

Look for a company with history and promise — one that's here today and here tomorrow.

### Not everyone needs the same modem.

The best way to keep modems from wasting your time and money is to buy them from a reliable supplier with a broad product line. Those with limited lines sometimes try to cram square pegs into round holes.

People with differing applications have differing requirements. Dealing with a broad-line supplier simplifies ordering, reduces training/support time and cost, and limits hassle and coordination.

In the end, if you give enough consideration to choosing the right supplier, you'll hardly have to give modems any thought at all.

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# PCs & WORKSTATIONS

## M I C R O B I T S

Douglas Barney

### Pretentious predictions



Ask any number of readers and they will tell you that prediction columns are about the corniest, most pretentious idea ever concocted. It didn't take any more arm-twisting than that: Another prediction column it is.

A reasonable columnist might call the companies involved and ask what they thought would happen in 1990. Think about their track records, though, and that starts to sound like a really dumb idea. Plus, it takes lots of extra time. Instead, we'll just wing it like everybody else.

**IBM:** Continued strong PC role, despite the utter failure of Presentation Manager or Officevision to take hold. Use of Next Step environment limited to weird academic installations. RT workstation fails again. Executives go a full year without saying anything truly funny.

**Compaq:** Company stays true to predictable strategy. Fast, compatible, overpriced systems continue to sell well, and Wall Street blesses them with ever-higher stock prices. No Micro Channel Architecture machine, despite customer

*Continued on page 36*

## Little drives have their day

*The 3 1/2-in. floppy disk drive has emerged as the leader of the PC market*

BY RICHARD PASTORE  
CW STAFF

It took a while, but the 3 1/2-in. floppy disk drive has at last clearly established its dominance in the personal computer market.

Last year, about 60% of worldwide floppy disk drive shipments were 3 1/2-in. drives, and a study released last month predicted that that percentage will jump to 77% in 1992. Yet, the tiny drive's reign could be brief, because new floppy technologies are already emerging.

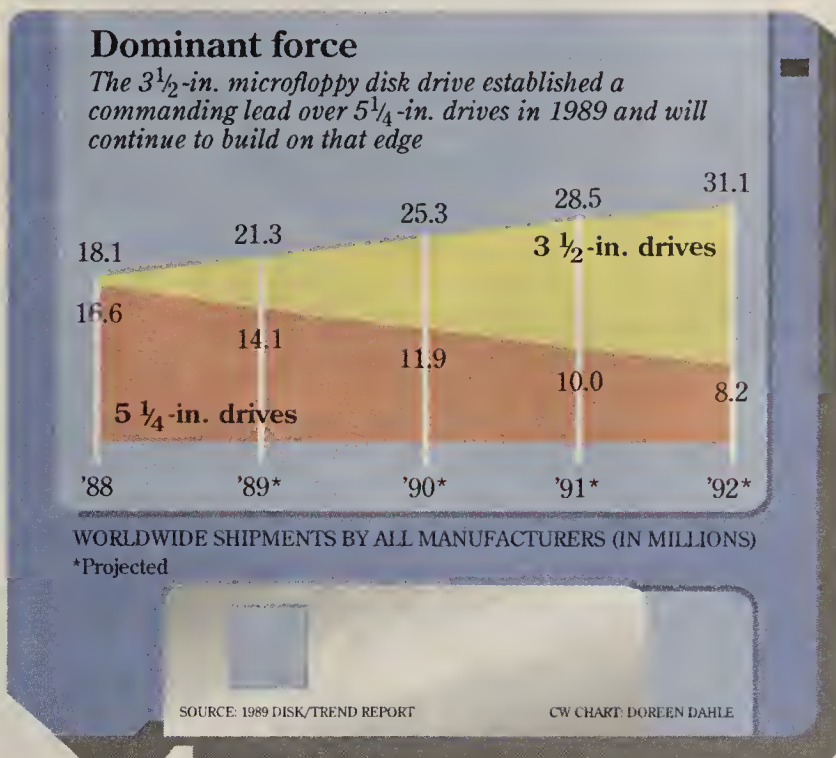
"The 3 1/2 is a done deal," said James Porter, president of Mountain View, Calif.-based Disk/Trend, Inc., which created the study. "The only momentum for 5 1/4-in. drives comes from clone makers who just copy old product." On the other hand, the hot laptop computer market is the force behind the 3 1/2-in. drive's ascendancy.

The 3 1/2-in. drive first shipped in volume in Japan back in 1981. However, it took several years to establish a standard, so it was not until 1988 that the drive first posted a slight shipment edge on the 5 1/4-in. form factor.

One new competitor for 3 1/2-in. products is the 2-in. form factor. But it may not have much of a shot at the floppy drive throne, according to Porter. Although the 2-in. drive is a viable alternative for very small systems, Compaq Computer Corp.'s LTE has proven that "you can squeeze a 3 1/2-in. drive into a laptop and still maintain a weight below seven pounds," he said.

### Dominant force

*The 3 1/2-in. microfloppy disk drive established a commanding lead over 5 1/4-in. drives in 1989 and will continue to build on that edge*



Consequently, laptop users may not embrace the 2-in. drive, which currently forces users to download data to incompatible office-based systems. A more likely usurper will be the new high-capacity 3 1/2-in. drives, which read and write to 20M-byte floppy disks.

These drives, sold mainly as add-on products for hard disk backup use, currently cannot write or read low-capacity disks. This year, downward-compatible versions that can read and write to 1M-byte, 2M-byte, 4M-byte and 20M-byte disks will appear. Toshiba reportedly has one ready for evaluation.

The logical extension is that the downward-compatible, high-capacity drives will replace the

less versatile standard-capacity 3 1/2-in. drives in PCs, Porter said. "It will be more expensive, but it will be worthwhile to users" who want to avoid the hassle of backing up a 20M-byte hard disk onto 1.44M-byte floppy disks, he noted.

Other findings noted in the study included the following 1989 estimates:

- Floppy disk drive shipments overall increased only about 1.5% because of a slower PC growth rate.
- Worldwide sales revenue for floppy drives was down about 8%, at \$2.6 billion, because of lower average drive prices.
- The 5 1/4-in. drive was down 15% in volume shipments vs. 1988 levels.

## A copious crop of key OS/2 kits

BY PATRICIA KEEFE  
CW STAFF

While applications for OS/2 Standard Edition trickle out at a maddening pace, related developer's kits continue to flood the market. Most notable are tools that will assist users in developing 32-bit, as opposed to 16-bit, programs.

The latest crop of kits includes offerings from the team of Microsoft Corp. and IBM, Interactive Images, Inc. in Woburn, Mass. and 1st Class Expert Systems, Inc. in Wayland, Mass.

Last week, Microsoft announced formal delivery of the IBM and Microsoft OS/2 Software Development Kit for OS/2 Version 2.0 with Presentation Manager, OS/2's graphical user interface.

A key component of OS/2 Version 2.0, which is slated for general release in 1990, is the ability to run multiple DOS programs concurrently.

In November, IBM and Microsoft said they would stop issuing OS/2 development kits.

*Continued on page 35*

### Inside

- Desktop deemed dire at Shearson Lehman American Express. Page 33.
- High-tech stock trading hits Wall Street. Page 33.
- Micro sales rise in the fall. Page 34.

## The COBOL Programmer Workstation and Its Impact on Productivity The Micro Focus Developers Conference Schedule

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- ☞ Evaluate the workstation's potential in your organization
- ☞ Learn about latest product developments and future trends

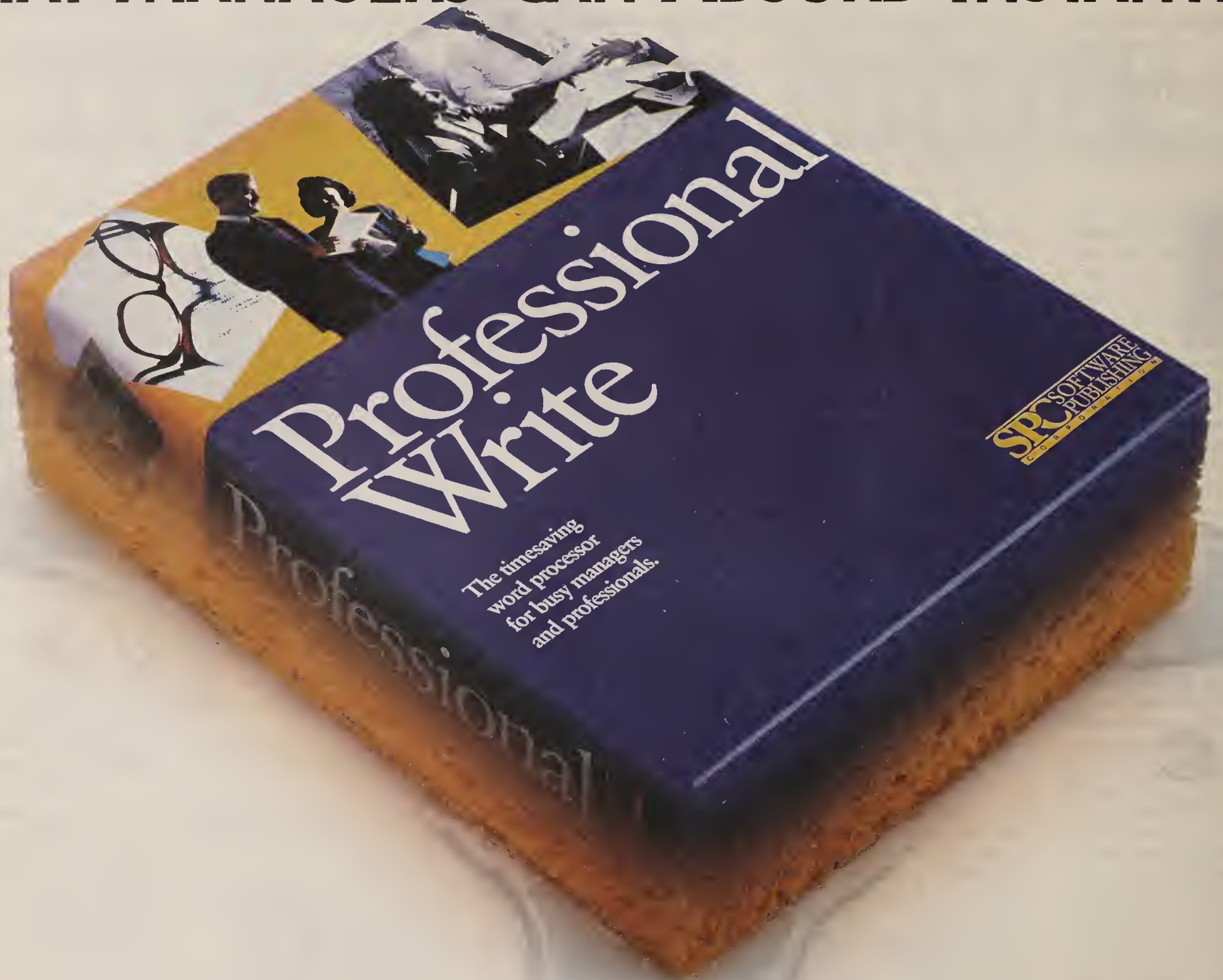
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# Amid industry pessimism, micro sales rose

DALLAS — Despite gloom and doom speculation from analysts, actual sales of microcomputers through computer specialty stores rose 4% in October over September sales, according to a report issued by Storeboard, Inc. last month.

Also, the Dallas-based market research firm's October statistics on retail sales of personal computers revealed that although the 260,000 machines sold in October were only marginally greater than sales in October 1988, corresponding revenue was up 3.5%. This sustained year-to-year growth was attributed primarily to increased customer purchases of Intel Corp. 80386SX- and 80386-based PCs.

These figures do not cover sales through mass merchandisers, company stores or direct sales forces.

## Vendor hoopla

Storeboard predicted escalating PC sales through November and December thanks to lucrative manufacturer incentives, including customer rebates ranging from \$100 to \$300, free software and trial programs.

October sales were broken out by the Intel Corp. chip family. Between January and October 1989, computer specialty store sales of 8088 and 80C86 microprocessor-based PCs dropped from 20% to 13% of all PCs sold.

Although still the best-selling CPU type, the 80286 category fell four percentage points to 44% during this period. In contrast, full-blown 32-bit 80386 PCs jumped 5% in market share, climbing from 14% in January to 19% in October. The biggest gainer was 386SX sales, which increased from 3% to nearly 12% of this market.

October sales performance by vendor is broken out into Chart A.

Cumulative year-to-date sales for the first 10 months of 1989 were 10% better than in the same period of 1988, but Apple Computer, Inc.'s sales dropped 18% below those of the first 10 months of 1988. "This decline is clearly related to the manufacturer's market focus on other channels of distribution, for example, direct sales, value-added resellers and university sales outlets, during the first

part of the year," Storeboard said.

With its 31.5% market share of all PCs sold through computer stores during the past 10 months, IBM continued as the vendor of choice. IBM's year-to-date retail PC sales were 8%

55SX at 15,000 units.

IBM sales through computer specialty stores were estimated by Storeboard to represent approximately 65% of the vendor's total domestic sales volume.

Compaq Computer Corp.'s sales of nearly 470,000 PCs

Deskpro 286E by nearly 1,000 units.

Other Compaq models that gained momentum during the month were the Deskpro 386/33 and the newly introduced LTE portables. "The notebook machines should be hot-selling items during the year-end season if there are no supply constraints," said Storeboard, which also suggested that LTE sales could erode sales of the more powerful SLT.

Other findings included:

- During the past 10 months, Hewlett-Packard Co. has realized retail computer sales of 43,500 PCs, 7,200 of which were sold in October.

- Epson America, Inc. realized a 48.3% growth in personal computer sales year-to-date over 1988.

- NEC Information Systems, Inc.'s year-to-date sales were 21.5% greater than in 1988.

- Toshiba's laptop sales alone have grown nearly 34% in comparison with the first 10 months of 1988.

- Zenith sales were off nearly 12% from the previous month. "The company's purchase by Bull conceivably dampened sales as the effects of the acquisition unfolded," Storeboard said. Still, year-to-date sales were nearly 32% greater than in 1988.

## Epson's uptick

Among leading PC vendors, Epson showed some of the sharpest gains in unit sales for the first 10 months of 1989

	Percent change year-to-date '89 vs. '88	Units sold year-to-date October '89 (in thousands)
• Epson	+ 48.3%	113.7
• Toshiba	+ 33.8%	59.6
• Zenith	+ 31.6%	45
• Compaq	+ 28.5%	469.5
• NEC	+ 21.5%	115.8
• IBM	+ 8.0%	748.6
• Apple	- 18.4%	283.4

SOURCE: STOREBOARD, INC.

CW CHART, JOHN YORK

above the first 10 months of 1988. With sales in excess of 18,000 and 16,000 units respectively, the Personal System/2 Models 50Z and 30 were IBM's best-selling models in October, followed closely by the PS/2

through October 1989 were 28.5% greater than during this same period in 1988. October sales alone, led by the Compaq Deskpro 386, were nearly 10% better than in September. The 386 model outsold Compaq's

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## OS/2 kits

FROM PAGE 31

ing separate kits in an effort to arrest speculation about conflicting versions of the OS/2 operating system. The kit is available from Microsoft only.

This latest OS/2 kit reportedly provides early software and tools designed to allow corporate and third-party developers to begin developing 32-bit applications for Version 2.0.

Applications developed from this tool kit, which includes a full suite of 32-bit application programming interfaces, can take full advantage of the Intel Corp. 80386 and I486 chip sets, Microsoft said. Also, Version 2.0 supports large, flat-memory address space, demand paging and the ability to manipulate large data structures.

Developers will need an Intel 386 or 486-based PC with 6M bytes of random-access memory, IBM's Enhanced Graphics Adapter or Video Graphics Array and a 60M-byte hard disk.

From Interactive Images comes a development tool said to enable programmers to create DOS applications that use many of the graphically oriented features found in the OS/2 environment.

Layout/Common User Access for DOS works with Interactive's Easel graphical applications development tools and is said to allow developers to create software that conforms to IBM's Common User Access (CUA) guidelines.

Available now for \$1,900, Layout/CUA for DOS runs as an application under OS/2 with Presentation Manager. Once the interface has been defined, it reportedly will automatically generate Easel/DOS code.

OS/2 versions of expert system development tools are now available from 1st-Class Expert Systems. The company unwrapped OS/2 versions of both its kits: 1st-Class Fusion, which costs \$1,495; and 1st-Class HT, which costs \$2,495. A free run-time license and toll-free telephone support are included, the vendor said.

On the applications side of the house, Firesign Computer Co. has announced OS/2 support in Outbound, its micro-to-mainframe file transfer package for unattended personal computers and nontechnical users.

Beta-test installations began this month for the OS/2 version, priced at \$300 per microcomputer. It will ship in March, the vendor said. Typical MVS and VM host licenses cost \$15,000.

## MICRO BITS

# Aldus unwraps user support program

**Aldus Corp.** has unwrapped Customerfirst, which allows registered users of Aldus products to receive 90 days of technical support by telephone, notices about upgrades and a free one-year subscription to the bi-monthly *Aldus Magazine*.

For longer term support, users can subscribe to the Extended Technical Support Service: Level 1 costs \$89 per product per year; Level 2 costs \$149 per product per year; and Aldus Corporate Services cost \$1,000 per year. For details, call Aldus. A

separate 900 number will enable users to pay only for the support they need at \$15 per call.

Rent, lease or buy? **Continental Resources, Inc.** is offering a free 14-page booklet that explains and compares the costs, obligations and risks of leasing vs. buying a personal computer and peripheral equipment. "A closer look at Buying, Leasing and Renting," includes a worksheet with scoring key and detailed comparison chart.

Users can call 800-937-4688

to obtain a copy.

"Sky Pilot. How high can you fly?" A new monthly publication is targeting an estimated two million computer "pilots." **PC Pilot** says it will help users of computer flight simulation programs get the most out of their software. At \$30 per year, readers reportedly can expect the same quality of information about flying found in aviation publications. Contact *PC Pilot*, Suite 2165, 2170 Broadway, New York, N.Y. 10024.

## Stock

FROM PAGE 33

der entry to verification on the mainframe — and have more time to spend serving their customers by keeping an eye on market fluctuations, said Art Markowitz, Commodity Exchange senior vice-president of operations and systems.

Under the more cumbersome current arrangement, scribbled trade instructions are passed from traders on the floor to intermediaries, who key the data

into terminals linked to the mainframe. This process adds time as well as margin for error to the trading process.

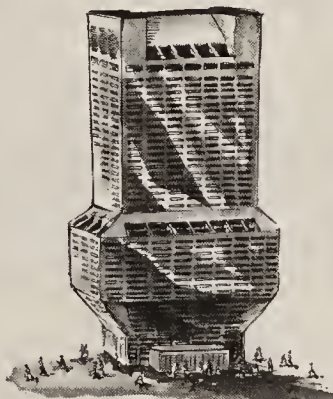
"We're trying to eliminate this conversion from paper to automated input by moving the process closer to the actual trading environment," Markowitz said.

The system will also benefit the exchange by automatically tagging each transaction with the time of execution. Regulators require all trades to be time-stamped to the nearest minute to facilitate investigation of the

transaction if improprieties are later suspected. "We'll be able to time it to the nearest second with the unit's internal clock," Markowitz said.

The Chicago Board of Trade, stung by a scandal last summer that allegedly involved fraudulent time-stamping by traders, has developed its own handheld system to ensure that traders cannot fudge transaction times in order to cheat their customers out of profits. The board announced specifications for its Audit system last month and is looking for a supplier.

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## Barney

FROM PAGE 33

demand. Executives, however, become true IBM clones.

Borland: Another good year. Philippe Kahn stays in command and puts his foot in his mouth less than once a year. Average software prices rise for the former low-ball kings.

Apple: Invents yet another buzzword. Something like Mega-hyperdesktop Media. Although no one knows what it is, it is heralded as a breakthrough. Sculley is profiled four more times in *Fortune* magazine. Sales rise.

Intel: Announces Intel I586. Ships shortly after OS/2 for the 80386 — in early 1991. Users able to run old software at warp speed, but new stuff from Microsoft bogs down the chip even at 30 million instructions per second.

Microsoft: Despite pressure to further separate applications and systems software, does not split the company in half. Essentially prevails in Apple lawsuit. Finally ships Windows 3.0. Declines to name it PM Lite. Revenue finally exceeds personal worth of founder.

Next: This will be the Ferrari of the micro world. It will sell well to a handful of status-conscious users who don't mind monochrome displays.

Lotus: 1-2-3/G will ship. Not

surprisingly, the bulk of users will be from Cambridge, Mass., and will receive free copies. In 1991, G becomes important and gains high single-digit market share.

A version of 1-2-3 for Windows does not ship.

Lotus/DBMS finally fades from our vocabulary as Lotus makes it clear that 1-2-3 Release 3 and proprietary database languages, not graphical database tools, form the firm's core front-end strategy. Lotus then reverses itself in 1991 when graphical database tools ship.

Versions of 1-2-3 Release 3 for Unix, DEC VAX and IBM 370 ship. The Macintosh version does not.

Lotus remains a solid number two, makes no major acquisitions and prospers nicely. Firm unfortunately wins lawsuit against Paperback and Mosaic, but cosmetic changes keep defendants out of hot water. Firm licenses keyboard-based Presentation Manager technology to a bunch of companies.

Presentation Manager: Despite what they say, this will never work effectively on a 2M-byte machine. Never!

Unix: There will be more articles on Unix than there are Unix users of nontechnical software.

Barney is editor in chief of *Amiga World*.

### NEW CONTRACTS

## McDonnell Douglas gets 1,000 Apple Macs

Apple Computer, Inc.'s Southwest Operations was recently awarded a three-year contract valued at \$9 million to supply McDonnell Douglas Corp. Space Systems Co. with 1,000 Macintosh IICX computers for use in its new Space Station Freedom building site in Huntington Beach, Calif. The project reportedly will serve as the first step toward a permanent manned presence in space.

Under the DOD Small Desktop Companion contract awarded to Zenith Data Systems last month, the U.S. Navy has agreed to purchase \$3 million worth of Wordtech Systems, Inc.'s Quicksilver Professional, a bundled version of DBXL and the Quicksilver Dbase language compiler. The Navy had planned to use Nantucket Corp.'s Clipper but switched to Quicksilver, Wordtech claimed.

Raytheon Co. has turned to Olympus Software, Inc. to help fulfill its Space and Naval Warfare Systems Command (Spawar) contract with the U.S. Navy. Raytheon will bundle Ul-

tracalc, Olympus' Unix-based spreadsheet, with its own Color Workstation for installation on U.S. Navy ships.

Silicon Graphics, Inc. has inked contracts estimated at approximately \$35 million to supply the U.S. Army Ballistics Research Lab with the vendor's Iris Power Series workstations and servers.

Cement maker Lone Star Industries, Inc. has installed Emerald Technology's Handshake product line to engineer its communications needs for Unix workstation-based file passing and Unix-to-IBM mid-range connectivity.

The State of California has established a pricing agreement that allows state agencies to make purchases from Compaq Computer Corp.'s complete product line through authorized dealers. If the agencies' procedures allow, the purchases may be made without competitive bids.

Textronix has a \$1 million,

two-year contract with the U.S. Forest Service. Rangers throughout Oregon and Washington will use 85 4211 netstations and 60 4696 and 4693DX color printers to analyze and document environmental impact, fire recovery and growth management issues.

AT&T Canada, Inc. and reseller Heron Technology Corp. have replaced a stand-alone computer with a facility-wide data processing system at the 223-bed Orillia Soldiers Memorial Hospital in Toronto. The new system features AT&T's PC 6386 Workgroup Systems running on an Ethernet network. The Unix System enables multiuser access.

Hewlett-Packard Co. has signed a site-license agreement with 1st-Class Expert Systems to distribute up to 200 copies of 1st-Class HT expert system development tool worldwide for HP's internal use.

IBM has signed a marketing and product development pact with Advanced Business Microsystems, Inc. (ABM) in Irvine, Calif., a maker of accounting software. IBM is now the exclusive marketer of Platinum, ABM's 19-module package, in the U.S. ABM will support Platinum and will work with IBM to develop future enhancements.

## NEW PRODUCTS

### Systems

Commodore Business Machines, Inc. has unveiled the Amiga 2500/30 personal computer. The system is designed to meet the needs of graphics, animation and video professionals, the company said.

The 25-MHz Motorola, Inc. 68030-based computer features a Motorola 68882 math coprocessor and 2M bytes of 32-bit random-access memory. Five full-size Amiga expansion slots, two IBM Personal Computer XT slots, two IBM PC/AT slots and a video expansion slot are also included.

The system retails for \$4,699. Owners of an Amiga 2000 series computer may upgrade by purchasing a 2630 card for \$2,195.

**Commodore**  
1200 Wilson Drive  
West Chester, Pa. 19380  
215-431-9100

Everex Systems, Inc. has introduced a 21 million instructions per second workstation that runs in the AT&T Unix operating environment.

The Step 8825 is based on Motorola, Inc.'s 25-MHz 88000 reduced instruction set computing architecture and is the sec-

ond in Everex's Step 88000 product line.

The workstation is available in memory configurations from 4M to 20M bytes and includes a variety of multiuser options.

Pricing starts at \$14,995.

**Everex**  
48431 Milmont Drive  
Fremont, Calif. 94538  
415-498-1111

### Software applications packages

Amisys, Inc. has announced a personal computer-based software application for financial institutions.

Amisys\*CTR is designed to automate recording and reporting of cash transactions in compliance with government regulations.

The program will reportedly run on any IBM-compatible PC with a hard disk drive. The price of the package is listed at \$995.

**Amisys**  
Suite 203  
1350 Arnold Drive  
Martinez, Calif. 94553  
415-370-0980

Corel Systems Corp. has announced Corel Draw for IBM Presentation Manager (PM).

According to the company,

the latest version of Corel Draw permits users to edit letter shapes; arrange text in curves, circles or rectangles; and perform graphics production tasks.

Corel Draw for PM also includes the Pantone, Inc. color system, which allows users to use specific colors from a Pantone Color Reference manual.

The product's retail price is \$595.

**Corel Systems**  
Corel Building  
1600 Carling Ave.  
Ottawa, Ont., Canada K1Z 8R7  
613-728-8200

### Software utilities

System Enhancement Associates has released a command-line driven utility for sorting Ashton-Tate Dbase files.

According to the vendor, users can sort up to 40M bytes of data in 20 minutes with the Dqsort package running on a Compaq Corp. 386/25 machine.

The program is capable of sorting within single or multiple fields with file sizes being determined by disk space.

The package runs on IBM PCs and compatible machines and sells for \$50.

**System Enhancement Associates**  
21 New St.  
Wayne, N.J. 07470  
201-473-5153

### OS/2 software

Caseworks, Inc. has introduced an enhanced version of its development, prototyping code generation and maintenance product for use with OS/2 Presentation Manager.

CasePM for C Version 2.0 allows for application building in either C or Cobol, the company said. Features include a what-you-see-is-what-you-get prototyper that monitors the Common User Access rules of IBM's Systems Application Architecture.

The package is priced at \$1,995 for a closed knowledge base version and \$3,995 for an open knowledge base version.

**Caseworks**  
Suite 130  
1 Dunwoody Ave.  
Atlanta, Ga. 30338  
404-399-6236

A 32-bit memory card developed to operate in all Micro Channel computers has been announced by Capital Equipment Corp.

The OS/2 RAM32 board automatically configures itself for any operating system or any 16-bit or 32-bit Micro Channel Slot, the company said. All eight megabytes of memory appear as high-speed cache memory to the system processor.

It is priced at \$299 without memory, and high-speed (80

nsec) single in-line memory modules (SIMM) are available for \$159 per megabyte. A two-year warranty on parts and labor is included.

**Capital Equipment**  
99 S. Bedford St., No. 107  
Burlington, Mass. 01803  
800-234-4232

### Board-level devices

Five Extended Industry Standard Architecture bus products, including Intel Corp. 80386SX-, 80386-, and 80486-based boards and peripherals, have been introduced by Mylex Corp.

The product line includes: the MAE486-25/33, a 25-MHz Intel 80486 system board that includes 128K bytes of write-back external cache and 8K bytes of internal cache; the MBE486-25/33 system board, without cache; the DCE376, a high-performance small computer systems interface SCSI controller for the IBM Personal Computer AT/32 bus; the LNE390 32-bit EISA Ethernet adapter; and the GXE020A graphics board, which incorporates a Texas Instruments, Inc. 40-MHz 34020 graphics processor.

Pricing ranges from \$425 to \$5,700.

**Mylex**  
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Fremont, Calif. 94539  
415-683-4600



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Not to mention the fact that Ingres gives you transparent access to your data—even in non-relational databases.

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These new computers were designed from a simple observation: People use computers differently. One user using a PC has different needs than a group working together on a network or multiuser system.

The COMPAQ DESKPRO 486/25 is for the individual whose job depends on a PC. It was designed from the ground up to unleash the power of the evolutionary new Intel 25-MHz 486 microprocessor.

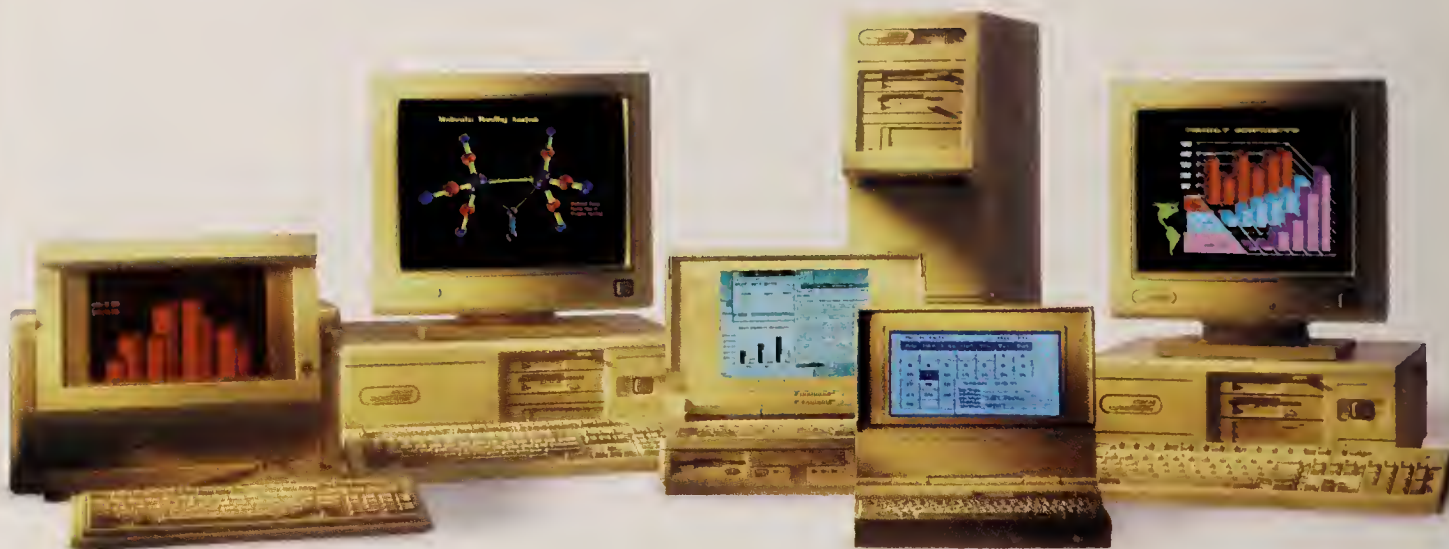
The COMPAQ SYSTEMPRO delivers an unprecedented combination of system performance and expandability to networks and multiuser systems. Its breakthrough design gives users the flexibility to work with both 33-MHz 386 and future 33-MHz 486 technology. It also provides the unmatched capability to work with multiple processors.

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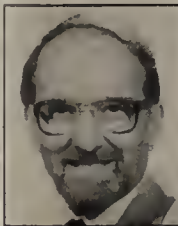


# NETWORKING

## DATA STREAM

Norman Weizer

### No such thing as free lunch



This is an article about what everybody knows and about free lunches. Now, for starters, most everybody knows the following:

Personal computers have a five to 10 times better price/performance ratio than mainframes and twice to three times that of minicomputers. They are becoming powerful enough to handle applications that required mainframes, or at least minis, a few years ago.

PCs and PC local-area networks are easy to install and are getting easier to use all the time.

So, for any new application, let's just throw a few PCs together with a LAN, write (or buy) some software, and we're in business. The mainframe is dead, and the minis are dying.

*Continued on page 53*

#### Inside

- Tandem spices up network software. Page 48.
- Codex offers inter-networking market a LAN bridge. Page 49.
- High-tech hits the high court. Page 52.

## ISDN works magic at kingdom

BY ELISABETH HORWITT  
CW STAFF

ORLANDO, Fla. — Walt Disney World Resort Complex has been realizing the cost efficiencies and communications benefits of Integrated Services Digital Network (ISDN) — but only on the voice side so far.

Since the beginning of last year, Vista-United Telecommunications, the Florida-based telephone company, has provided a variety of

Joseph Hegarty.

Disney World maintains its own entirely separate data network but is monitoring how Vista-United's ISDN services are working, with an eye toward using them for data sometime in the future, Hegarty said.



Transparent delivery of guest information and guest services is the "driving force" behind Disney World's ISDN network, Hegarty said. ISDN provides visitors with enhanced access to key services within the

complex such as a centralized 911 dispatching service and Disney World's Information Network, a dial-in service that provides "an unbelievable amount of information, including what time a parade starts, park hours,

the price of tickets and special events," he added.

For example, when a visitor dials into Disney World's Information Network, the ISDN link passes along both the name and number of the caller for more personalized service.

ISDN also provides Vista-United customers with the ability to share certain communications features and applications, across multiple private branch exchanges (PBX), such as call accounting and the "ring again" telephone feature, saving the cost of implementing each feature on each site's PBX, Hegarty said.

Vista-United's ISDN customers have implemented links across Northern Telecom, Inc. SL-1 switches at various sites rather than accessing Centrex-like ISDN services on Vista-Un-

ited's Northern Telecom DMS 250 central office switches, Hegarty said.

In addition to Disney-owned entertainment facilities and hotels within the complex, the Swan Hotel, which is a member of the Westin Hotel Co. chain, recently signed up for ISDN services.

While Disney World's data department is monitoring Vista-United's ISDN activities in connection with the Disney complex, the entertainment company is "very comfortable with the [networking] applications they have from Unisys and IBM," Hegarty said. The complex currently uses point-to-point data connections with some backup lines, he added.

Disney World will be more likely to consider ISDN as its host vendors start supporting it, Hegarty said.

Disney World has refused to discuss its future data networking plans.

## Report says smart hubs will spin into new decade

BY SALLY CUSACK  
CW STAFF

Smart hubs — wiring closet systems that support and interconnect local-area networks based on various media and access methods — will be a \$750 million dollar market by 1993, according to a report from Forrester Research, Inc. in Cambridge, Mass.

Mary A. Modahl, director of network strategy research at Forrester, said increased securi-

ty and significant cost savings for users are two factors accelerating the smart hub market. The hubs also include several additional features such as routing among diverse networking protocols and Fiber Distributed Data Interface bridges.

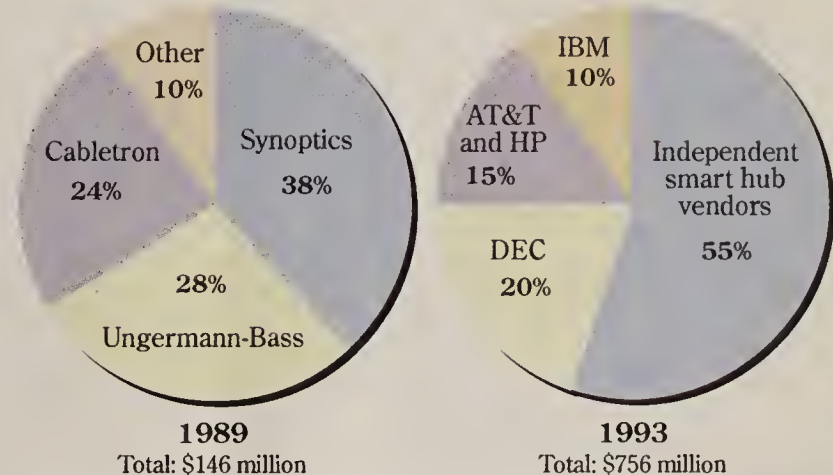
"The ability to manage a network on a desk-by-desk basis will draw many users. Ports can be enabled or disabled from the hub by the network administrator," Modahl noted. Forrester said

*Continued on page 53*

### Paradigm shift

Vendors that dominate the smart wiring hub market today will be bumped out of the spotlight as big names enter the growing market

MARKET SHARE BY REVENUE



SOURCE: FORRESTER RESEARCH, INC.

CW CHART: JOHN YORK

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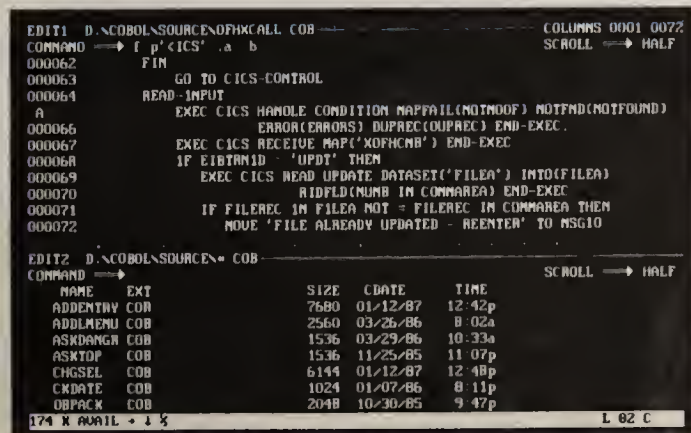
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NETWORKING  
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**MOTOROLA**

# **"I DIDN'T CODEX"**





I KNOW  
I DID THAT."



# Tandem restructures its software suite

BY JEAN S. BOZMAN  
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. last month moved to provide operations managers with a more tightly integrated and simplified view of its enterprisewide network by enhancing the firm's Distributed Systems Management (DSM) software suite.

DSM can be used to export Tandem network "events" to IBM's Netview network management software running on IBM mainframes.

The enhanced DSM packages, which are priced from \$1,000 to \$5,000 for a single copy, are an extension of the 2-year-old DSM architecture, said Steve Saltwick, marketing programs manager for Tandem's Networking Products division. Saltwick said that while DSM previously provided "some base-level services," the six new offerings increase operational efficiency and lower user costs.

## Corporate address

Of the six products, DSM/SNA View most directly addresses large corporate networks that have both Tandem and IBM host systems and need a single focal point for information, Saltwick said. DSM/SNA View allows Tandem network messages to be displayed on Netview screens with Tandem CPUs appearing as IBM Physical Unit 5 devices and communicating via IBM's LU 6.2 peer-to-peer communications protocol.

The five other Tandem network management products include the following:

- DSM/Product Manager tracks problems and the speed with which they are addressed by system operators. It provides scripts that allow experienced operators to record problem-solving steps for use by less experienced personnel.
- DSM Solutions (DSMS) is a monitoring and control facility for large networks of Tandem machines and manages objects on-screen. "For example, I could ask a status screen to show me the status of all the ATMs on a bank's network. By pointing a cursor at that object, I would see that 199 of 200 ATMs were operational and that one was down," Saltwick said. A query would show the location of the failed ATM.
- Guardian 90 Performance Analyzer allows network managers to fine-tune a mainframe.
- EMS Faststart is a programmer productivity tool to support the DSM network-management environment. It allows an applications programmer writing in Cobol to generate an Event Message System event that can be forwarded to Netview or dis-

played on a DSM console.

• Seeview is a windowing environment that gives Tandem managers an integrated view of events occurring at any point in a multisite, mixed-vendor network. While Seeview will not allow Tandem users to control IBM's Netview, it will allow

them to display messages from Netview or from Cincom Systems, Inc.'s Netmaster network management facility.

One of Tandem's largest customers, New York-based Securities Industry Automation Corp. (SIAC), is already putting DSMS to use, said Jay Polish, support

director at SIAC's planned Metrotech data center. SIAC, which supports the New York Stock Exchange and the American Stock Exchange with a 200-CPU array of Tandem processors, has been testing DSMS in-house for several months.

The new Tandem software will help SIAC to split its data center operations into two sites — one in Manhattan and another

at Metrotech in Brooklyn. DSMS will give SIAC operators the ability to control SIAC's network from either site once the Brooklyn center comes on-line in 1991.

"DSMS gives us the ability to go to a dual environment without adding staff," Polish said. "It allows us to control our network of applications from a single point."

# NetWare 386 makes it easy

## Netware 386 said to come close to minicomputer speed

BY PATRICIA KEEFE  
CW STAFF

SAN FRANCISCO — "Netware for the '90s" debuts at the Palace of Fine Arts here today, where sources say Novell, Inc. will paint a robust picture of the long-awaited Netware 386. The 32-bit network software will run over both Intel Corp. 80386 and 486 systems, eventually offering up to 10 times the performance of its predecessor and support for up to 1,000 users.

"It's definitely a screamer," two sources said independently. The server capability announced is expected to take local-area networks up the ladder to compete in terms of capacity with minis and superminis.

Novell will detail a two-year release strategy for Netware 386 and outline plans for various product announcements throughout 1990, said sources briefed by the firm. Licensees of Portable Netware, a Unix port that requires Netware 386, are slated to attend along with providers of various 386 servers.

A single Netware 386 server will be demonstrated supporting 250 users located on four LANs, including two DOS, an Apple Computer, Inc. Appletalk and an OS/2 LAN, according to industry sources.

Netware 386 will be released in two stages: Netware 3.0 will

ship in the third quarter along with a tool kit for Netware 3.1, which will ship in early 1990.

Sources said Netware 3.0 will include vastly improved performance, security and disk capacity; virtually "unlimited" numbers of files and volume size; use of the 386's virtual 86 mode to eliminate the 640K byte partition for applications; reduced system overhead; and more built-in services.

A modular approach will allow Novell to mimic 3Com's NetWare Protocol Architecture, which lets users drop in and out of specific protocol stacks as needed, sources said. This will eliminate the need to dedicate a personal computer to each gateway.

Netware 3.1 will feature a communications server, the ability to support multiple protocol stacks and support for OS/2 LAN Manager's Named Pipes interprocess communication protocol on the server — the latter a significant reversal in strategy, said one analyst.

The long overdue and much-talked-about global naming facility, which is expected to resemble Banyan Systems, Inc.'s Streettalk, will ship as an upgrade to 3.1 at the end of 1990, a source said. Also on tap is an X.400 mail gateway that supports Novell's Message Handling System mail protocol.

## Novell Brings 'Horsepower' To NetWare

BY TIMOTHY HAIGHT

SAN FRANCISCO — Novell Inc. last week unveiled NetWare 386—its fastest, most extensive, and ultimately, most open local area network operating system yet.

The Provo, Utah, LAN company also showed off new hardware and software developers' kits, and detailed its strategy to make NetWare an enterprise-wide network computing platform.

Users generally lauded the strategies and the new products, many of which had been expected (CommunicationsWeek, May 1). But several customers called for Novell to execute parts of the strategic plan more rapidly; some of the vendor's most important feature additions won't arrive until mid-1990.

"NetWare 386 is very significant, because it will allow Novell not only to add more users on a network but also to provide better management facilities and more horsepower for each job," said Bill Connert, director of computing for the University of Michigan.

## Novell wows users with NetWare 386

By Susan Breidenbach  
West Coast Bureau Chief

SAN FRANCISCO — As expected, Novell, Inc. took the wraps off NetWare 386 here last week, promising 500 attendees of its 5th Annual Developers Conference that the first release will be out by early fall.

Designed for Intel Corp. 80386-based systems, the latest version of NetWare is a 32-bit network operating system that supports up to 4G bytes of addressable memory, 32 terabytes of

## Netware 386 Will Triple Power of Current Version

BY RACHEL PARKER  
AND MARK STEPHENS

Bringing new firepower to its network operating system war with Microsoft Corp., Novell Inc. will announce its next-generation Netware 386 product today at San Francisco's Palace of Fine Arts, according to sources briefed by the company.

Offering what Novell has said will be at least three times the performance of the company's current top-of-the-line Netware 2.15, Netware 386 is a complete rewrite of the Netware operating system and runs in protected mode on 80386-based file servers. The product is intended to blow the doors off its major competitor, Microsoft OS/2 LAN Manager, which runs in 80286 protected mode as a task under OS/2.

Novell is not expected to abandon its 286-based Netware 2.1X product line.

Novell president Ray Noorda told financial analysts and investors attending the Hambrecht & Quist conference last week in San Francisco that Netware 386 will ship within 90 days. Sources close to the company said an August or September ship date is likely.

Netware 386 is expected to be priced in the \$7,000-to-\$8,000 range, substantially higher than the current Netware 2.15. See Netware, Page 93

## NetWare 386 Preview: Speedy New Release Was Worth the Wait

Editor's Note: Since early July, Novell Inc.'s NetWare 386 operating system has been beta tested at several sites across the country. Presented on this page and the facing page are the opinions and experiences of two beta testers, one at Martin Marietta Data Systems and the other at the University of California at Los Angeles. NetWare began shipping last week, according to Novell officials.

By Garry Frenkel

By now most people interested in LANs have heard and read a great deal about Novell's new NetWare 386. Longtime Novell users have eagerly awaited NetWare 386, and as a beta-test user I can easily say that it was worth the wait.

From the use of 1.2M-byte floppy disks (finally), to the scaled-down but still excellent documentation, to the simple installation (yes, it really does take less than 20 minutes), to the increased functionality, to the near-blinding speed, Novell has done a splendid job.

In our lab at Martin Marietta Data Systems, we have seen applications running on a NetWare 386 server show performance improvements of greater than 40 percent over a NetWare 286 server. This is

impressive. The improvements in security are also welcome. Passwords are now encrypted at the workstation before being transmitted to the server.

For users running older versions of the workstation shell, the server can be set to allow unencrypted passwords.

In the past, our monitoring equipment was easily able to read the NetWare passwords as they were transmitted to the



# Bridging the connection gap

Codex's Etherspan bridge provides fractional T1 links for remote LANs

BY ELISABETH HORWITT  
CW STAFF

Addressing users' need for more flexible remote LAN-to-LAN connections, Codex Corp. re-

cently announced a bridge that is said to harness the cost-efficiencies of fractional T1 circuits to link local-area networks at remote sites.

The 6310 Etherspan Bridge,

Codex's first entry in the inter-networking market, is said to format its LAN output in the D4 framing format. That format allows traffic to be handled intelligently by private T1 switches

and Digital Access and Cross-Connect Systems at carriers' central offices. These switches can then allocate multiple 64K bit/sec. channels — or a fraction of a T1 link — to a given LAN-to-LAN connection.

The ability to use and pay for just as many 64K bit/sec. channels as LAN-to-LAN traffic warrants provides users with greater flexibility as well as bandwidth

economies, according to Codex spokesman Kenneth Miller.

In contrast, bridges and routers that do not support D4 framing must allocate either a single 64K bit/sec. circuit or an entire 1.5M bit/sec. T1 link to a given LAN-to-LAN connection, he added.

The benefits of fractional T1 technology as a LAN-to-LAN connection are currently limited to long-distance connections, since only one regional operating company, New England Telephone, now offers the service, according to William Rahe, president of The Aries Group, a Rockville, Md.-based consulting firm.

However, it still makes sense for users to use a full T1 link between the LAN bridge and the nearest long-distance carrier site, which can then allocate LAN traffic in various directions

# to believe what you read.

## Novell Is Shipping Netware 386 3.0 Earlier Than Expected

BY DAVID J. BUEGER

PROVO, UT — To the surprise of beta testers and industry insiders, Novell Inc. shipped last week its first copy of Netware 386, Version 3.0 earlier than expected. Early users will be limited to file and print service, however, with server-based applications and multiple protocol support not scheduled to appear until 1990.

Netware 386, price significant increases in services over Netware previous top-end pro-

InfoWorld

## NetWare 386 gets high praise

BY JOEL SHORE  
Provo, Utah

Novell Inc., riding a wave of rave reviews from beta testers, last Tuesday began shipping NetWare 386, keeping its word that the "networking platform for the 1990s" would be before the end of Sep. The first customer to a production version of NetWare 386 VNI was Coca-Cola Foods Co., one of 24 sites that tested the product.

"Corporate America is growing its LANs fast, pushing them further than they could have imagined," Cheryl Currid, director of applied Information Technology at Coca-Cola Foods.

### NOVELL CHANGES RULES

"As a result, LANs were being asked to do things that they weren't designed or optimized to do. From my perspective, the wall was about to be hit. Now, as a result of the efforts that went into NetWare 386, the rules and the limitations of the network game have just changed. Novell has pushed the wall back," said Currid.

As part of its development program, the product underwent vigorous beta testing at 24 sites, including United Parcel Service, Martin Marietta Corp., Southern California Edison and Oregon State University.

—Continued from our [beta]

"We've had very few problems with server crashes," said David Hoisbe, network project director at the University of Utah. "Overall performance is impressive."

Hoisbe said ad hoc tests showed Netware 386 performing roughly 15 to 25 percent faster than the 286 version. Beta testers liked the easier installation and the capability for one volume per physical drive.

Workbench, based on

Novell Inc.'s NetWare 386

ownership of the premier naming

service—StreetTalk—a run for its

money, nor will it reduce the

unique appeal of Microsoft

Corp.'s LAN Manager, with its

OS/2 compatibility and such fea-

tures as automatic disconnect/

reconnect.

However, NetWare 386 will

blow away the competition—in-

cluding Novell's own 286-based

NetWare 2.15—in performance,

PCWeek

## NetWare 386 May Pack Punch To Knock Out the Competition

By Bob Enyart

Novell Inc.'s NetWare 386 won't give Banyan Systems Inc.'s service—StreetTalk—a run for its money, nor will it reduce the unique appeal of Microsoft Corp.'s LAN Manager, with its OS/2 compatibility and such features as automatic disconnect/

functionality and flexibility, based on a beta version examined by PC Week at Novell's Pro-

For Other NetWare 386 News, Turn to Pages 8, 10 and 35.

Provo, Utah, headquarters. For those with the firm's

wherever with the firm's

initial

## NetWare 386: The network server platform for the '90s

BY JODI MARDESICH

SAN FRANCISCO—The waiting and speculation are over. Novell has unveiled NetWare 386 v3.0 and v3.1, the company's "server platform for the '90s."

"NetWare 386 is a major redesign of the NetWare operating system that takes advantage of 386 architecture," said Richard King, vice president of software engineering for Novell's NetWare Products Division. "It is a 32-bit operating system, so it fully exploits the capabilities of the 386 [chip] and improves performance."

"Our benchmarks show NetWare 386 is 200-300% faster than the 286-based versions of NetWare."

NetWare 386 supports up to 250 nodes per server, up to 32GB volumes, with 32 physical drives per volume for a total of 1,024 physical drives per server; 100,000 concurrent open files; more than 2 million directory entries per volume; a maximum file size of 4GB (files can span physical drives); a maximum volume size of 32 terabytes (1,000GB); and up to 4GB of memory in the server.

NetWare 386 will ship third quarter 1989.

### LOADABLE MODULES

"NetWare 386 is not just another file server," King said. "It's designed as a

network server operating system."

King said the operating system has been architected in a modular way, so that users can incrementally add functions to the server platform using server-based applications called NetWare Loadable Modules (NLMs).

NetWare printing services, the LAN drivers, disk drivers, Btrieve, and some NetWare utilities, including installation, are being implemented as NLMs.

"By loading an NLM, you actually extend the operating system," King said.

"The key to NetWare 386 is its

continued on page 9

LAN TIMES



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**I**F YOU CAN allocate bandwidth on an as-needed basis, and as fractional T1 costs come down as compared with full T1, the product really is something to shout about."

WILLIAM RAHE  
THE ARIES GROUP

over fractional T1 connections, he added.

"If you can allocate bandwidth on an as-needed basis, and as fractional T1 costs come down as compared with full T1, the product really is something to shout about," Rahe said.

Another feature that differentiates Codex's bridge from the competition is support for the vendor's 9800 network management system, which monitors LAN-to-LAN traffic and can identify whether links are being underutilized or overutilized, Miller said.

Codex will be introducing other bridge and router products in the future, he added.

Most LAN bridges and routers cannot access fractional T1 services because they do not support D4 framing, Miller said. One exception is Wellfleet Communications, Inc., which announced D4 framing for its bridge and router family in July 1988, a company spokesman said.

The Bedford, Mass.-based vendor announced fractional T1 support as soon as carriers such as AT&T began offering the service, he added.

Wellfleet recently announced an X.25 packet-switching network interface option for its LAN bridges. It is available immediately and priced at \$1,600.



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# Supreme Court rulings may fly on modem winged feet

BY ELLIS BOOKER  
CW STAFF

The U.S. Supreme Court is considering disseminating its opinions via modem, offering virtually immediate access to court rulings to interested parties, news organizations and database companies.

For now, the high court typically prints about 125 copies of each opinion. Of these, about half go to the press; the remainder are given to other organizations

and interested persons, who must wait in line for them outside the court's public information office in Washington, D.C.

At least two on-line database companies that serve the legal profession — Mead Data Central Corp.'s Lexis and Westlaw — transcribe the hard-copy versions and place them on their electronic networks within 24 hours.

Project Hermes — a two-year pilot project named for the messenger of the Greek gods — was announced by the

court on Dec. 18 and should be up and running by the spring, according to spokeswoman Toni House.

"We've been looking into this for years, ever since the Atex system went in," House said. In 1981, the court installed a word processing and electronic publishing system from Atex, Inc.

House said the court had originally considered using an outside firm to distribute the opinions electronically but opted to handle the project itself, using a small number of primary subscribers who will act as distributors for the others. The estimated annual cost to primary distributors will be \$500, House said, adding that the court will not earn money on the service but will only seek to recover costs.

Security was a keen concern in design-

ing Hermes; for this reason, the court elected not to provide subscribers with on-line access.

Project Hermes calls for the use of out-bound modems connected to a single personal computer, probably an Intel Corp. 80386-based machine.

As another security measure, the PC will not be networked to the Atex system, the Hewlett-Packard Co. minicomputer used for office automation or the 18-month-old On-line Supreme Court Automated Resource, or OSCAR, system that provides electronic library services to the court.

"We'll literally carry a floppy disk across the room," House said.

Last week, the court was scheduled to meet with several organizations, including a consortium of two dozen groups sponsored by the American Bar Association, to hammer out the on-line distribution arrangements.

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## Sun rises with search service

BY JOANIE M. WEXLER  
CW STAFF

To fuel applications software development for its X11/News platform — the company's windowing system for Unix — Sun Microsystems, Inc. is opening its information network and libraries with Newshare, a database search and electronic mail service.

The fruit of a joint development venture with General Electric Information Services in Rockville, Md., the service aims to allow developers — and eventually the user community — to get their technical questions answered more rapidly and beef up productivity.

Newshare will be provided by Sun, with General Electric Information Services providing the backbone network as part of the joint venture agreement.

### Speedier development

"There are always requirements to effectively support your development community — which is frequently not within your own organization," said David Page, computer industry manager at General Electric Information Services.

"With a higher level of support, many more applications will be developed because they'll get out the door faster, and this will give users a broader selection of products."

Newshare, which makes use of Sun's Open Look graphical user interface, is slated for first-quarter 1990 availability to third-party vendors in Sun's Catalyst program, according to the organization.

The Newshare service is scheduled for international release and end-user access in late 1990, according to Sun. When Newshare becomes available to workstation users, they will reportedly be able to submit queries and receive Sun's technical and other information more quickly than they do now.

General Electric Information Services was previously involved in a similar project with Microsoft Corp., providing the remote processing technology and wide-area network for the company's Microsoft On-Line technical support system for software developers.











# Weizer

CONTINUED FROM PAGE 45

We can put together LAN-based applications for less than half the cost of more complicated solutions, get them up faster and make the users happier because they have the control over their environment that they want. We'll just belly up to the LAN bar and get a free lunch with our sarsaparilla.

Right? Well, maybe.

There is one major piece that's left out of the above scenario: support. What do you do when the LAN breaks? Who backs up all of that critical data on the PCs and the LAN server? Who takes care of the security and integrity of the databases? How do you keep viruses and other nasty animals out of the software?

Our surveys of LAN-based system users and other research show that the average LAN has between 10 and 20 PCs attached. In real life, users require the equivalent of one full-time support person for every 10 to 15 PCs on average. Combining that person's costs (about \$60,000 per year, fully loaded) with the LAN, hardware and software maintenance costs, we find that it costs between \$500 and \$700 per month per PC to support such a LAN-based system.

Some users tell us that they are not spending nearly as much as that for support. When we investigate more carefully, we usually find that they are actually spending more, but the costs are hidden. Perhaps one or two highly paid engineers or financial analysts or programmers are actually spending a significant part of their time doing the maintenance. Or perhaps the system is inadequately maintained, and the costs of the lost productivity are not counted.

Hey! What about the free lunch?

Well, I guess the old saying is still true: "There's no free lunch."

# Smart hubs

CONTINUED FROM PAGE 45

that in addition to supporting fiber optics and coax, the hubs use unshielded twisted-pair wiring, making it easier to install in many buildings. Based on telephone interviews with 52 Fortune 1,000 telecommunications and information systems managers, the study showed that in major cabling jobs, 65% of the companies were using unshielded twisted pair, 50% had shielded and 37% utilized coaxial cable.

This is the first year of this market, Modahl said, and a \$149 million market share just does not attract the big players. Smaller networking companies, such as Ungermann-Bass, Inc., Synoptics, Inc., Proteon, Inc. and Cabletron Systems, Inc., which already have a small installed base, are being eyed by Digital Equipment Corp. and IBM for acquisition according to Forrester.

From a technological standpoint, the toughest barrier to cross will be integrating the bridges and routers into the chassis; while users prefer unshielded twisted pair, there is still a need for shielding where high noise and interference levels exist. Coaxial cable is still required in certain computer system environments.

Smart hub vendors will have to support a variety of media to achieve total success in today's marketplace, the report concluded.

I am not saying that a LAN-based system solution is never appropriate. Mainframe- and mini-based systems also have very high support costs. All that I am saying is that the up-front costs are only the tip of the cost-of-ownership iceberg. You have to look carefully under the surface to determine the true costs of an application and to compare the merits and problems of solutions based on the various-sized platforms. It is not a "no-brainer" and probably won't be for a long time.

A LAN with its attached PCs is actually a very complicated distributed processing information system. There are lots of things that can go wrong. This technology is still relatively new, and not all of the bugs have been worked out of it. The suppliers are currently more inter-

ested in adding bells and whistles to their current systems than in making them more foolproof.

The suppliers, however, are not ignoring the support issue. They are developing network support and management systems that can isolate some problems and automatically reconfigure the LAN or cut off the node causing the problem. These systems will be able to interface with standard network management systems, such as IBM's Netview, allowing remote support of multiple LANs. Programs that allow automatic backup of files from local PC hard disks to a central tape system and automatically distribute and install new versions of common software to all PCs on the LAN are also in the works.

When the technology does mature in about five years, the support costs will decrease. However, even at that time, it will not be cheap. The information and applications that will be implemented on LAN-based systems will be very important to the health of the companies that use them. These systems will still require a great deal of care and support.

So, the next time someone asks you to belly up to the LAN bar for a free lunch, ask him about the price of the suspenders that you will need to hold up your trousers while you are there, or else you might end up being embarrassed in more ways than one.

Weizer is a senior consultant at Arthur D. Little, Inc.

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F 1



NEW PRODUCTS

**Local-area networking hardware**

A VDT that is compatible with DOS-based multiuser personal computers is now available from Link Technologies, Inc.

The MC2PC offers a 14-in. flat screen and is used in conjunction with personal computer slave cards and/or software to provide a 78-Hz screen refresh in a PC work-cluster environment. The unit comes standard with a parallel printer port and is available in green or amber display phosphor.

The list price for MC2PC is \$459.  
**Link Technologies**  
47339 Warm Springs Blvd.  
Fremont, Calif. 94539  
415-651-8000

IQ Technologies, Inc. has introduced a network interface developed to connect laptop personal computers to local-area networks.

Called Plan, the product reportedly creates a node via the laptop's parallel port and does not require individual computer interface cards or laptop docking stations.

The interface is housed in a rectangu-

lar box that measures 6 by 5 by 1½ in. The product is priced at \$595.

**IQ Technologies**  
11811 N.E. First St.  
Bellevue, Wash. 98005  
206-451-0232

**Local-area networking software**

Softsolutions, Inc. has announced Perfectsolution 1.0, a document management software system designed to help personal computer network managers and users organize their files.

The document location and management facility allows users to build document profiles via categories; for example, author, application, data created and so

on. A document's text can also be indexed so that any word can be used in a full-text search across the network.

Prices are \$2,495 for each installed server and \$295 per workstation.

**Softsolutions**  
625 S. State  
Orem, Utah 84058  
801-224-0920

**Network management**

Applied Computing Devices, Inc. has announced the Foundation Solution, a turn-key package of hardware, software and services for the Enterprise Network Management (ENM) application.

The product can be used as an "in-service" system or as a training and prototyping tool that can facilitate Network Management Application development for a comprehensive ENM application set, the vendor said.

The standard ACD Foundation Solution system package includes: a 32M-byte reduced instruction set computer rated at 16 million instructions per second with 400M bytes of storage, a Digital Equipment Corp. VT320 console terminal, a log printer, a report printer and two Systems Network Architecture interface connections.

Other facilities are also provided, and the company offers three weeks of training for two people and a 40-day application engineering consultation.

**ACD**  
Aleph Park  
100 N. Campus Drive  
Terre Haute, Ind. 47802  
812-232-6051

**Links**

Digiboard, Inc. has announced a multi-channel communications controller for the Extended Industry Standard Architecture bus.

The Digichannel C/X Cluster Controller incorporates an Intel Corp. 80186 10-MHz host adapter card with 512K bytes of dual-ported random-access memory and as many as two 16-port external C/X concentrators. The board provides up to 32 ports from one bus slot, and four boards can reside in a single computer. Ports can be located up to 1,000 feet from the host computer, the vendor said.

The product will be available Jan. 25, 1990 and will be priced from \$1,995.

**Digiboard**  
6751 Oxford St.  
St. Louis Park, Minn. 55426  
612-922-8055

Simware, Inc. has announced a menu-driven software package that allows IBM 3270 terminal users to access applications on a variety of non-IBM systems through a consistent interface.

The package, called Simdialout, is a host-based product that conforms to IBM's Systems Application Architecture/Common User Access interface standard. The product operates in public and private X.25 networks and includes a central control feature that allows system managers to control access, according to the company.

Pricing depends on mainframe size and ranges from \$15,000 to \$30,000 per copy.

**Simware**  
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## EXECUTIVE TRACK



**Charles Mueller** has been appointed associate division director of the computing and telecommunications division at the U.S. Department of Energy's **Argonne National Laboratory** in Argonne, Ill.

Since joining Argonne in 1975, Mueller has been a nuclear engineer and manager of the probabilistic risk assessment section in the reactor analysis and safety division. Before joining Argonne, he was a senior engineer at Bettis Atomic Power Laboratory in West Mifflin, Pa.

Mueller holds an MBA from the University of Chicago, a doctorate in nuclear engineering from Northwestern University and a bachelor's degree from the Illinois Institute of Technology.

**James A. Ohlweiler** has been named vice-president of management information systems at San Francisco-based **PLM International, Inc.**, an integrated equipment leasing company.

Ohlweiler, 47, joined the firm from Citicorp Management Logistics, where he was director of technology. He has more than 20 years of IS experience and has held senior systems management positions with Leaseway Transportation Corp. and Coastal Industries, Inc.

Ohlweiler holds an MBA from Ohio State University and a bachelor's degree from Kent State University. In his new position at PLM International, he is responsible for corporatewide MIS operations and support.

### Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Co-chituate Road, Framingham, Mass. 01701-9171.

## College means business with IS

*Worcester Polytechnic takes down-to-earth approach to information technology*

BY MICHAEL ALEXANDER  
CW STAFF

**A**cademia is often accused of lacking a realistic view of the business world, but Worcester Polytechnic Institute (WPI) should not be counted among those said to be sporting rose-colored glasses.

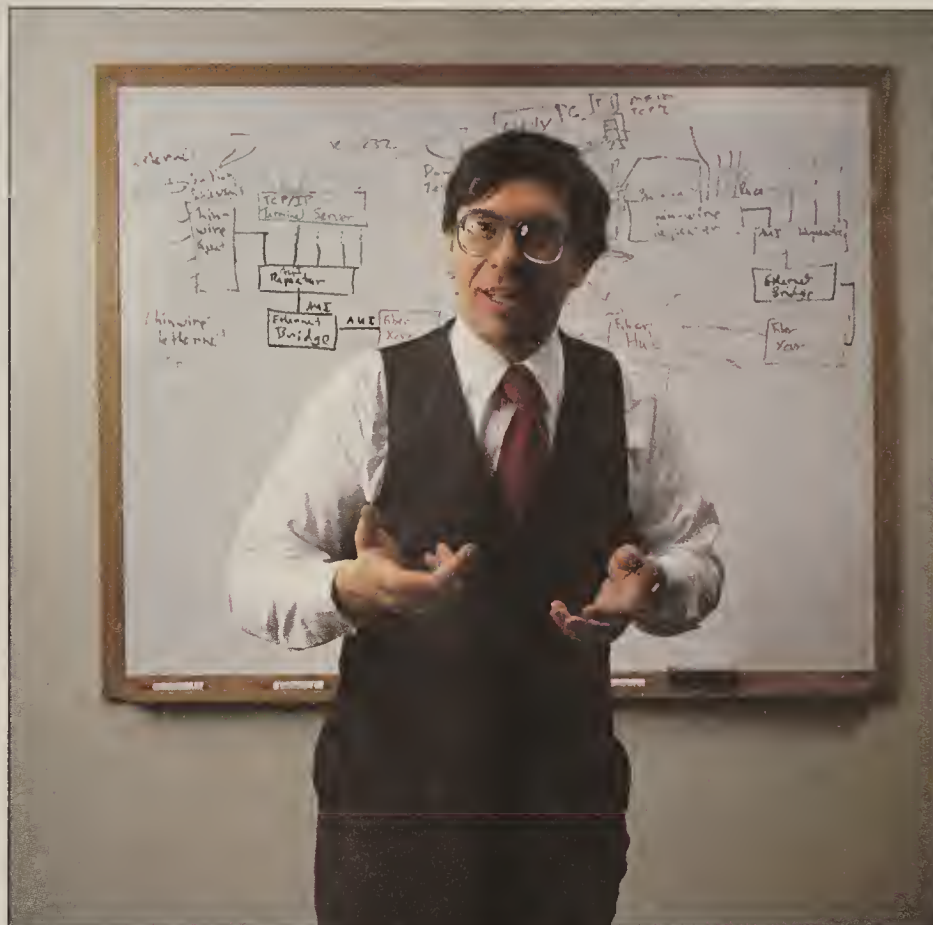
The small college in central Massachusetts practices what it preaches with a big-business-like approach to using and investing in information systems technology.

In the past five years, WPI has put hundreds of personal computers and workstations on campus; installed minicomputer and mainframe systems for academic and administrative computing; revamped its accounting, payroll, student enrollment and other key information systems; laid in a network that interconnects every computer on campus; and constructed a multi-million-dollar computer center.

When college officials talk about the school's IS strategy, they are also quick to talk about the need to gain market share, enhance competitiveness, boost efficiency and all of the other needs common to most businesses. As with many corporations today, IS is seen as critical to the organization's survival and growth.

There is a marked decrease in student interest in science and engineering, exacerbated by a decline in the number of college-age students, explains David Cyganski, vice-president of information systems and services. The two factors pose challenges for U.S. colleges, especially science and engineering colleges like WPI — and they portend ominously for the nation's future as a world leader, he adds.

"That is absolutely frightening data," concurs Jon Strauss, WPI's



HERB SNITZER

**WPI's Cyganski: Avoiding pools of competing IS entities**

president. "But we continue to increase our market share and maintain our enrollment levels [currently the largest in WPI's history]. That has been achieved through a combination of actions: providing the technical support that our students expect and recruiting more broadly, nationally and internationally."

As a technical college, WPI's computing resources are particularly vital to its ability to attract students and to the quality of its academic life, Strauss says. But the investment of \$15 million in systems hardware and a new computer center has been substantial for a college with an enrollment of only

2,500 students.

"The investment reflects both the increasing importance of information technology to the business we're in and a strong commitment as an institution of technology," Strauss explains. "It required a great leap of faith. The initial impetus came from the faculty, but the importance of technology certainly struck a resonant chord in me."

Cyganski has been the chief architect behind much of the college's IS strategy. He oversees administrative and academic computing branches from the George F. Fuller Laboratories, the newly constructed building

*Continued on page 62*

## Salaries to bubble up in the new year

BY ALAN J. RYAN  
CW STAFF

**F**or those who wished you all good things in the new year, the message may have gotten through. According to one recent study, 1990 starting salaries for information systems professionals will rise 4.9% beyond 1989 record highs.

The study, conducted by San Francisco-based Robert Half International, Inc., was based on an analysis of thousands of job orders from employers received by 135 Robert Half offices in the U.S. Using the data, Robert Half reported actual salary ranges for 1989 and projected ranges for 1990, based on near-

term salary trends.

According to the report, senior project managers can look for starting salaries in the \$48,000 to \$62,000 range, a 7.3% increase over this year; information systems directors will be paid salaries in the \$65,000 to \$87,000 range, or 4.8% over 1989; and systems analysts can expect starting salaries ranging from \$35,500 to \$45,500, a 4.5% gain for 1990.

Max Messmer, chairman and CEO of Robert Half, says the demand for IS workers continues to be strong. "Technological advances in the field keep starting salaries relatively high because of the demand for skilled candidates," he says. Additionally, he says, since changes in tech-

nology require additional training, seniority plays less of a role in this field than it does in most other professions.

For programmers, the starting salaries will be in the \$25,500 to \$33,000 range, the lowest hike in the survey at 2.6% over the 1989 range. The starting salary for computer operators will be in the \$20,000 to \$28,000 range, a 4.3% gain over 1989.

Messmer says the salary ranges are national averages, and geographic variances should be applied to all IS starting salaries of less than \$60,000. For example, starting salaries in California, Connecticut and Massachusetts tend to be approximately 5% higher than the national average, while starting salaries in Arizona, Florida and Maine tend to run 9% to 10% below the national average.









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## BOOK REVIEW

## Look, then leap: Making the case for calculated risk-taking

**DOING BUSINESS BOLDLY**

By Daniel Kehrner  
Times Books, \$19.95

There's no safety in standing still. The ground you are on may feel as stable as bedrock but, given the right conditions, even bedrock can crumble. And when that starts to happen, you may very well be

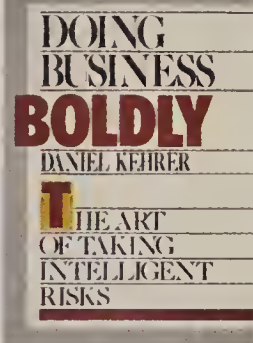
better off out on a limb.

In fact, the basic premise of *Doing Business Boldly*, by business journalist Daniel Kehrner, is that the surest way to get killed in business these days is to stay in one place and one mind-set too long. Security is really nothing but a seductive illusion, Kehrner maintains. In the real world, nothing is constant except change and the inevitability of risk. That being the case, it is a far wiser course to make a calculated leap toward opportunity than to stick with the known and the proven.

Kehrner doesn't pretend to be uncovering any new universal laws here. The art

of taking intelligent risks (which happens to be the subtitle of the book) is as old as alchemy and a lot more frequently practiced in modern times. That long and continuing tradition is amply acknowledged in Kehrner's treatment of the subject. Profiles of contemporary risk-takers weave a dense pattern throughout the text, and quotations from an eclectic chorus of risk advocates, both ancient and modern, punctuate chapters.

Truth is, if Kehrner had put nothing more between the covers than that wildly assorted collection of quotable quotes, he and Times Books would probably be justified in asking for



\$19.95. Consider, for example, the reputation for renaissance learning you could acquire by dropping a few well chosen words from not only Drucker but Cervantes, Will Rogers and Freud (yes, Freud.) The next time someone says, "Should we risk it?" you can respond with aplomb, "As Ralph Waldo Emerson once said, 'Always do what you are afraid to do.'"

But Kehrner has a lot more here than one-liners. He veers back and forth between current research on the nature of risk and risk-takers and close-up portraits of skillful riskers in a variety of fields. That may sound like a confusing read, but it works. The reason is that the portraits are not just about personalities but about how those personalities functioned during intervals of high-risk decision-making.

It is, for example, a lot easier to grasp why flexibility is three-quarters of successful risk-taking when you read the odyssey of Roberto Goizueta. Goizueta endured the status of public enemy for several weeks when he miscalculated the dangers of messing with an American icon. He is also, in case you haven't guessed, the chairman and chief executive officer of The Coca-Cola Co. and the man who gave us New Coke and Coke Classic.

As Kehrner makes clear, there were good business reasons for Goizueta's decision to dump the formula that made Coke the world's favorite drink. For one thing, in 1986 — at least in America — a lot more people liked the idea of Coke than the taste of it. The company had lots of data to support that fact. The one thing that neither Goizueta nor anyone else at the company could know from all the data they collected was the extent of the sentimental attachment between the soft-drink drinking masses and what they perceived as The Real Thing.

Goizueta brought back the formula with an inoffensively altered name. What may be less known is how phenomenally profitable that mistake turned out to be. Coca-Cola reaped record sales and profits that year, largely due to the fact that people went back to drinking the original Coke in record numbers.

You might be wondering what this has to do with information systems management. In terms of direct address, nothing at all: John Akers and his restructuring of IBM comes up briefly, as do Xerox and a handful of other industry names. For the most part, though, the heroes here are drawn from other arenas such as venture capital, genetic engineering and fashion.

Still, the principles represented are extremely germane in these times when IS executives are urged to reach, gamble and initiate change. As Will Rogers once said, "Even if you're on the right track, you'll get run over if you just sit there."

JOANNE KELLEHER

Kelleher is a *Computerworld* features editor.

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TAKING  
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Michael Packer

In search of  
IS flexibility

The senior vice-president of information services at a brokerage firm recently heard the following lament from the firm's president.

"I can't tell you what IS support the business will need next year, much less five years from now — it all depends on the markets. Why can't you build systems that can handle new products and management information needs quickly and inexpensively? You tell me that with new systems tools and a lot of money and time to rebuild old applications, we'll finally have flexible systems. I'm not sure I believe that."

Business and IS managers all struggle with the problem of building flexible systems to respond to an uncertain world. Most of them pin their hopes on better data management and new tools like relational databases. Yet fancy tools and techniques alone will never make systems truly flexible. It's important that you — and your chief executive officer — understand why.

Ultimately, systems are inflexible because a firm embeds or "hard-wires" into its systems architecture assumptions about what products it offers, how it competes and how it manages itself.

For example, a firm that was organized around different product lines built independent systems for each product division. Later, when the firm reorganized around customer segments, it couldn't pull together complete customer profiles because the entire systems base was hard-wired by product and lacked common customer numbers.

In another case, a large bank decided on a more aggressive acquisition strategy. But its systems were built on the assumption that transaction volume would increase by no more than 100%. The bank's executives were faced with an unexpected systems investment to loosen that constraint.

Explicit or not, these assumptions will always be present. Trade-offs always exist in systems design, and these trade-offs must be resolved by choosing one design alternative over another. Any time a design choice is made, some assumption is embedded into systems.

The more fundamental the design choice, the harder it is to be flexible if that business assumption changes. The trick is to recognize which assumptions are likely to change and which are appropriate to hard-wire.

Where do problems with systems flexibility most frequently arise? Here are four areas that usually need attention:

- Standards for hardware, systems software and telecommunications. Any decision to respond to a pressing business need by a quick fix — introducing incompatible hardware, yet another database management system or custom-modified systems software — means a compromise of future flexibility.

- Data architecture. Comprehensive, firmwide data management has failed in most firms because of organizational battles and the immensity of the task. As a result, data redundancy and inconsistent data definitions are rampant.

- Shared vs. dedicated systems. In many firms, different businesses believe they must either share a common system or build separate ones. If IS built systems allowing them to share some functions, such as customer billing calculations, without sharing others, such as customer service, then each business could have the flexibility to meet its own needs while gaining shared system economies.

- People. Flexibility is a function of people even more than of systems. IS staff have often assumed implicitly that busi-

ness needs can be clearly specified and will remain constant while they build a complex system. Instead, IS staff must learn to accommodate changes in business direction and to adopt new ways of building systems in order to achieve systems flexibility.

What can you do to make systems more flexible? First, examine your systems architecture and explicitly list the assumptions that have been hard-wired into them. This process often reveals major gaps between current business strategy and the systems base.

Second, define which areas in the business direction are unknowable and which simply have not yet been clarified. For instance, predicting new securities products in financial services two years

in advance is pretty much impossible. In contrast, understanding the extent of a geographic expansion is a matter of clarifying the business strategy.

Then design your architecture to make as few assumptions as possible about the unknowable areas.

Third, estimate the lead time and costs of changing fundamental assumptions you are hard-wiring into new systems. Then show business executives where you are building in flexibility — and how much it will cost them if they change their minds.

Packer is vice-president and director of the information technology group at The MAC Group, a Cambridge, Mass.-based international general management consulting firm.

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## Top dog

Worcester Polytechnic Institute is at the top of its league in installed information technology per user.

Today, there are some 1,200 personal computers on campus for students, faculty and administrative employees. "Every faculty member [250 in all] has a PC," says David Cyganski, vice-president of information systems and services. "There are open labs for all students where they can go into a nonstressful atmosphere and use computers."

There are also between 50 and 100 Digital Equipment Corp. and Sun Microsystems, Inc. workstations, DEC and Hewlett-Packard minicomputers and an Encore Computer Corp. mainframe.

"Buying the Encore was not a conventional decision," Cyganski says. "We found ourselves with an aging time-sharing computer and had to move to a modern platform. We wanted a substantial increase in processing capability and a system that was upgradeable, but we did not want to spend a lot of money to get it. We also wanted to run Unix so as not to get stuck in a technical cul de sac."

The last step of the five-year plan, completed in March 1989, was to install a campuswide network that would link the college's computer systems.

"We decided to work on a network at the end of the plan, when we felt that the technology would have settled and would be such that we could hook up any device, from mainframes to personal computers," Cyganski says.

The college installed a thin-wire Ethernet distribution system based on Transmission Control Protocol/Internet Protocol with fiber-optic links between buildings at a cost of \$2.8 million. Also rolled into the job was a rewiring of telephone systems and a closed-circuit television network.

"We wanted a plain-vanilla system that would allow for high-speed communications," Cyganski notes. "There's not a machine on campus that cannot be hooked up and be a full partner in the network."

MICHAEL ALEXANDER

## WPI

FROM PAGE 55

that houses the college's computer center, office of academic computing, teaching laboratories and other computing-related facilities.

"The computer center embodies the mainframe house, and the office of academic computing

oversees the PC house," Cyganski explains. "We're split along technology lines because it takes a different experience set to deal with each."

There are 25 full-time IS staffers and about 50 part-time staffers, most of whom have been culled from the college's students. "The division of labor is hierarchical and very much along corporate lines," he says.

Cyganski, who received a Ph.D. in electrical engineering from WPI in 1981, was a professor at WPI and a member of a committee that convened to draft a five-year plan to meet the college's growing computing needs. "We did not want these little pools of information systems entities competing and contradicting each other on communications protocols and in

other areas," he says.

Halfway through the five-year plan, Cyganski was appointed WPI's first chief information officer and, in February 1989, vice-president of information systems and services. His position of CIO was created to reflect the importance of IS to the entire institution beyond the immediate needs of the students and faculty, Cyganski said.





Executing an ambitious five-year IS plan would be daunting under any circumstances, but when the end users are members of technical and scientific academic communities, the challenge might have paralyzed many IS professionals. Cyganski, however, seems unfazed by the accomplishment.

"He supervised the installation of three major information

systems in three years, which is absolutely unheard of, as well as a major network that we installed in less than a year with zero repercussions," Strauss says. "He has reason to be proud. It has worked out magnificently and that is due largely to his efforts."

What does Cyganski do for an encore? Start planning for the next five years, he says.

There are certainly two areas that we will need to look at," Cyganski says. "We know that we will have a major expansion in the number of graphics workstations on campus, and that certainly has to be planned carefully. While we're paying \$2,000 to \$3,000 per PC, it's not unreasonable to spend \$10,000 to \$20,000 for a basic workstation."

Keeping up with the escalating costs and changing technology will be fundamentally more difficult problems, Cyganski adds.

"The harder issue that will need to be resolved is that as people rely more on computers, they require more support," he says. "And when corporate resources shift, people start getting anxious."

## CALENDAR

Outsourcing information systems and issues associated with creating partnerships with external providers will be the theme of a Nolan, Norton & Co. conference scheduled for Jan. 25 in Chicago.

The forum, "Outsourcing the Data Center: You Can't Do Everything Yourself," will provide information on what some companies are doing with outsourcing, an understanding of the economic trade-offs and a review of the critical alternatives and approaches for communicating with executives.

For more information, contact Lois Chase at Nolan, Norton in Lexington, Mass. at 1-800-888-6246.

### JAN. 15-21

**Pacific Telecommunications Council's 12th Annual Conference.** Honolulu, Hawaii, Jan. 14-17 — Contact: PTC '90, Honolulu, Hawaii (808) 944-4874.

**Advanced Methods in User Interface Design.** Los Angeles, Jan. 16-18 — Contact: UCLA Extension, Short Course Program, Los Angeles, Calif. (213) 825-3344.

**Computer Graphics Show.** New York, Jan. 16-18 — Contact: Computer Graphics Show, Silver Spring, Md. (301) 587-4545.

**Service and Quality Performance Conference.** St. Louis, Jan. 17-18 — Contact: Washington University, St. Louis, Mo. (314) 889-4556.

**Strategies for Developing High-Performance Documentation.** White Plains, N.Y., Jan. 17-19 — Contact: Information Mapping, Inc., Waltham, Mass. (617) 890-7003.

**Superconductor Applications Global '90 Convention.** Long Beach, Calif., Jan. 17-19 — Contact: Superconductor Applications Association, El Toro, Calif. (714) 586-8727.

**Network Security in the Federal Government Seminar.** Washington, Jan. 18-19 — Contact: Infolan Seminars, Austin, Texas (512) 328-4636.

**Software Support Conference.** San Francisco, Jan. 18-19 — Contact: Institute for International Research, New York, N.Y. (212) 883-1770.

### JAN. 22-28

**Building on Effective Standards Program.** Orlando, Fla., Jan. 22-24 — Contact: Quality Assurance Institute, Orlando, Fla. (407) 363-1111.

**Improving Productivity in EDP System Development.** Mesa, Ariz., Jan. 22-26 — Contact: Applied Computer Research, Inc., Phoenix, Ariz. (602) 995-5929.

**Software Management Strategies Conference.** Anaheim, Calif., Jan. 22-24 — Contact: Ashley Pearce, Gartner Group, Inc., Stamford, Conn. (203) 967-6757.

**Conference for Information Processing Executives.** New York, Jan. 23 — Contact: Kathy Collins, International Data Corp., Framingham, Mass. (800) 343-4952 or (508) 872-8200.

**Infotext '90.** Las Vegas, Jan. 23-24 — Contact: Infotext Publishing, Inc., Capistrano Beach, Calif. (714) 493-2434.

**Printed Circuit Board Expo '90.** Ft. Lauderdale, Fla., Jan. 23-25 — Contact: PMSI, Alpharetta, Ga. (404) 475-1818.

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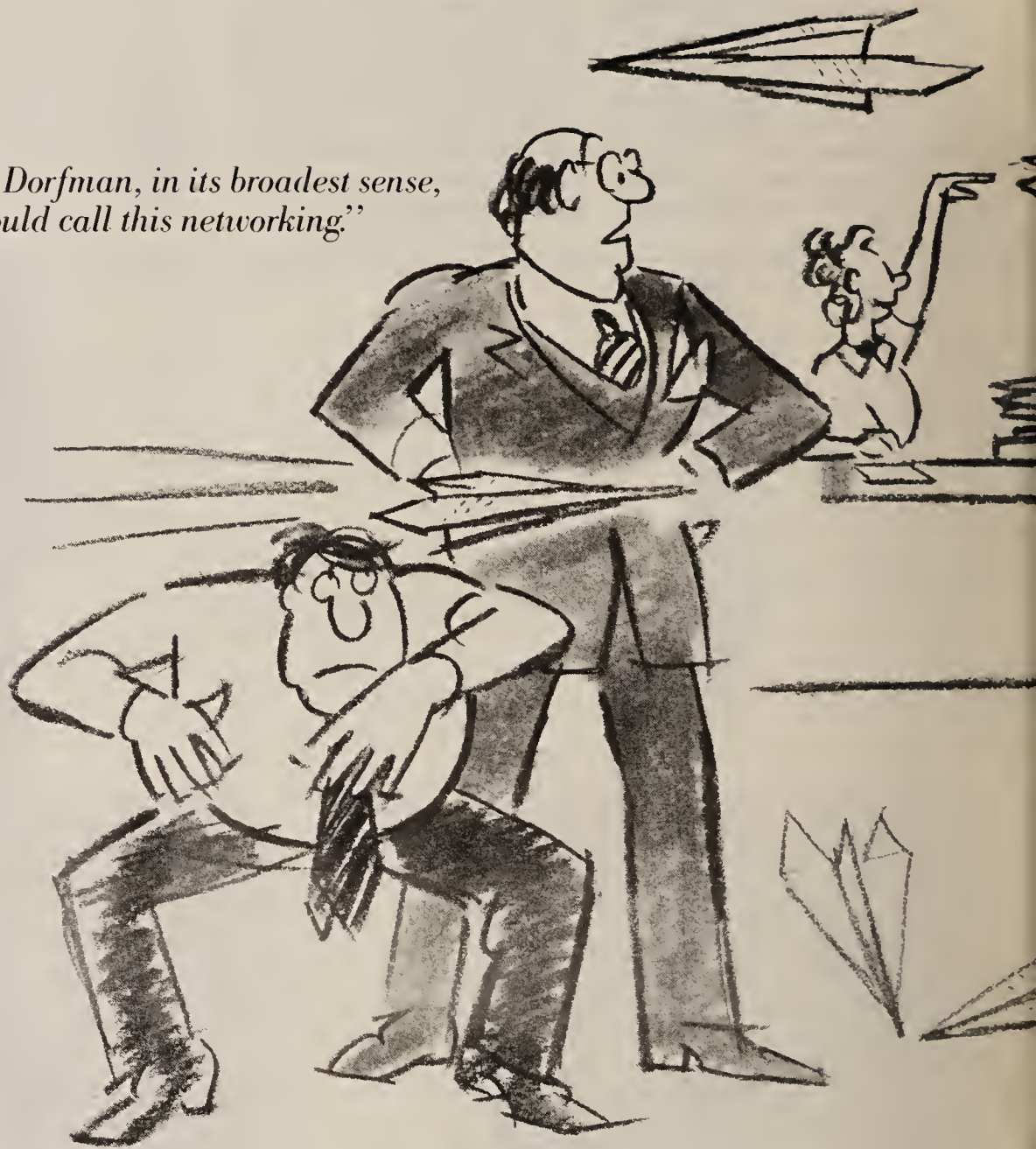
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*"I suppose, Dorfman, in its broadest sense,  
you could call this networking."*



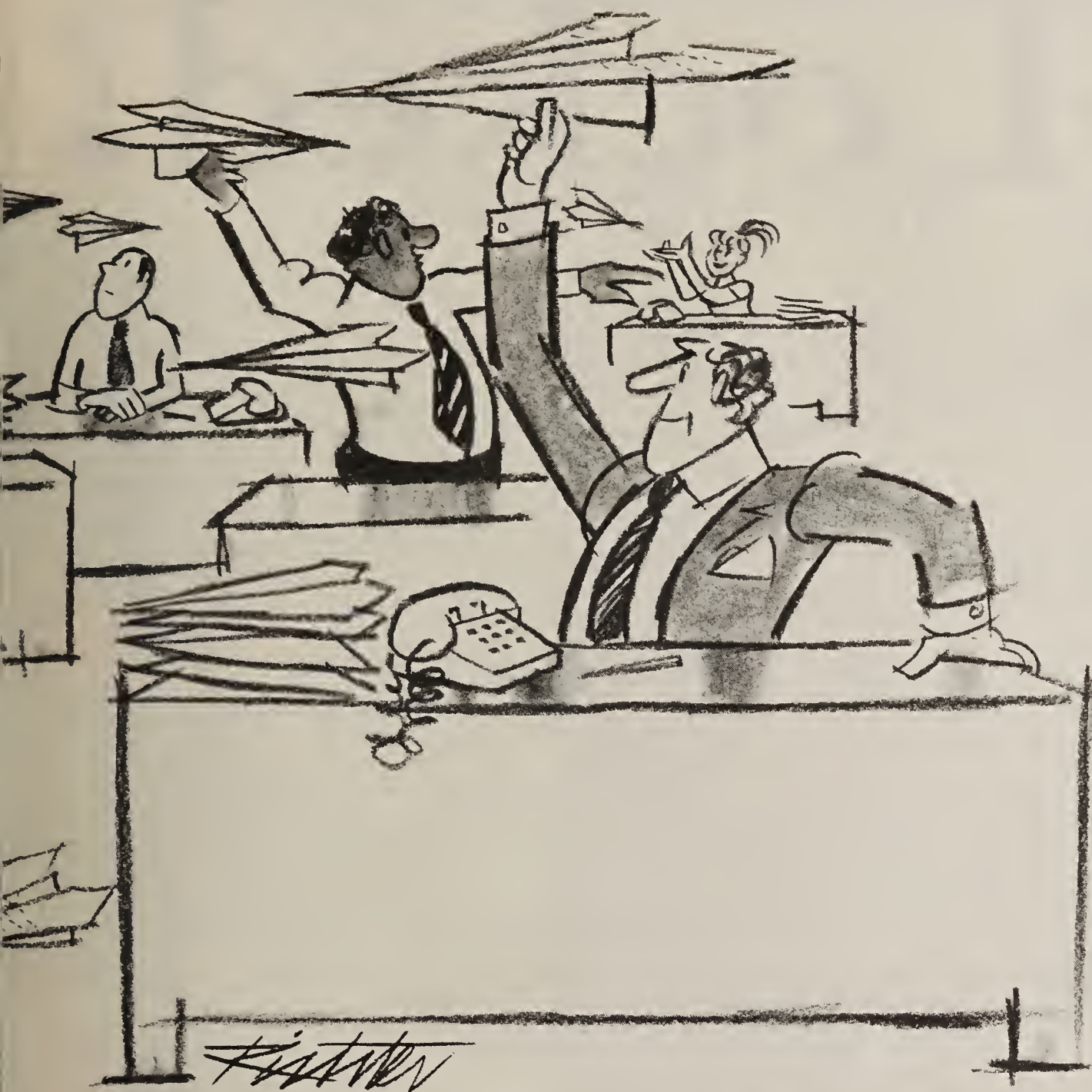
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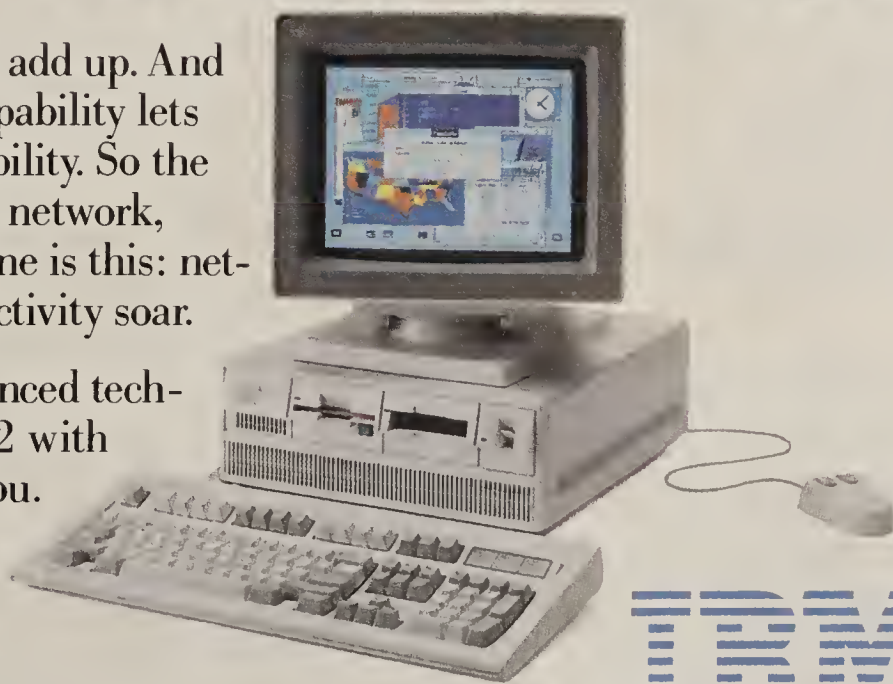




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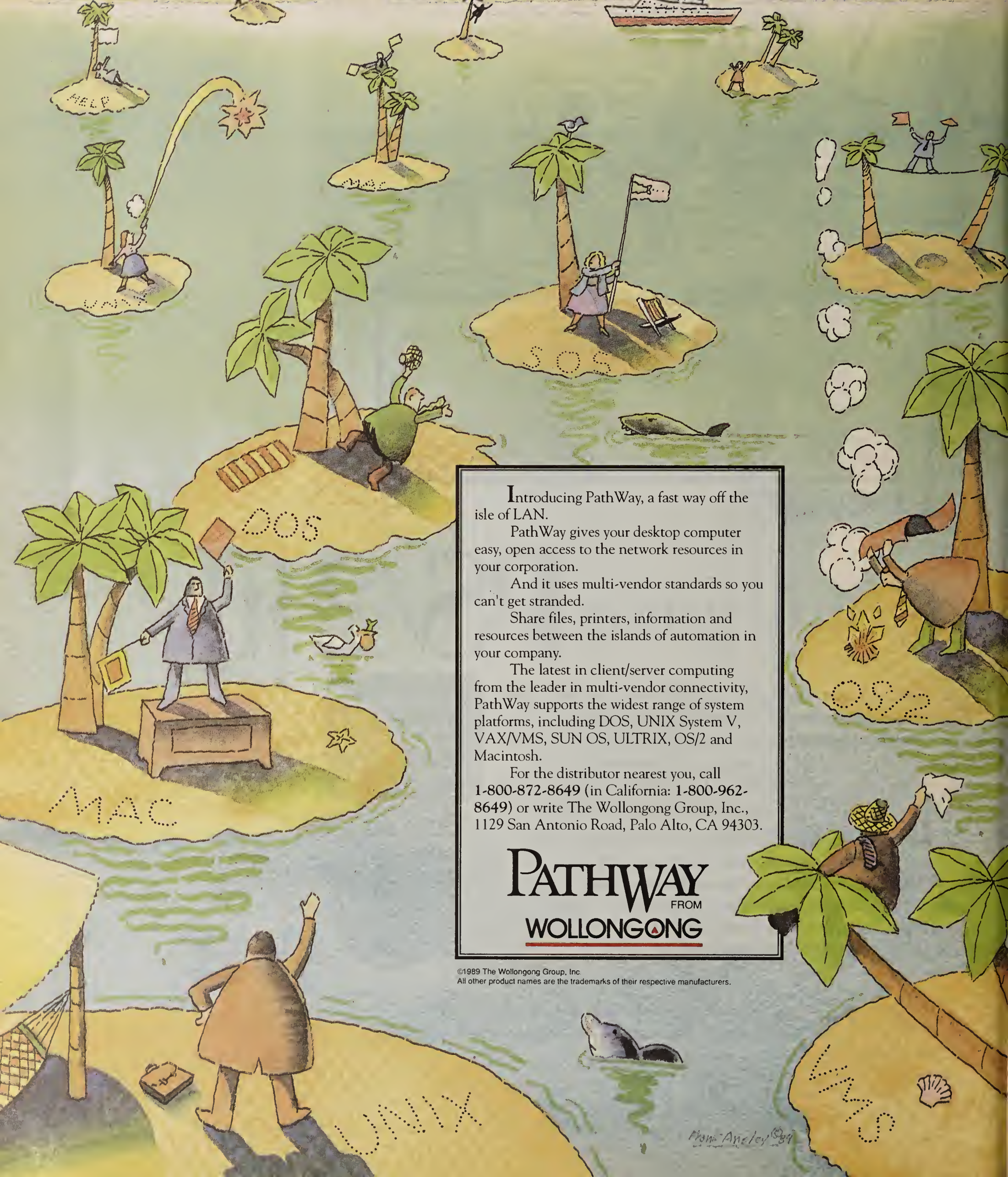
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# EXECUTIVE REPORT

## THE DOLLARS AND SENSE OF OUTSOURCING

### The ride is no bargain if you can't steer

BY ALAN RADDING

**I**t is a scene that is repeated more than 10,000 times every day in wallpaper stores across the country: After browsing through stacks of sample books, a shopper settles on a pattern. When the selection is pointed out to the clerk, he picks up the phone and calls Kinney Wall Coverings, a major distributor based in Oakland, Calif. Moments later, the entire transaction has been processed, and the customer leaves the store knowing exactly when his wallpaper will arrive.

You might assume that achieving this level of responsiveness requires Kinney to maintain a vast and sophisticated data center. Wrong. All Kinney has on its premises are terminals for the customer service representatives and two information systems specialists — director of information technology Bill Jonopulos and an assistant. Everything else required to support its daily load of at least 10,000 customer inquiries and 200,000 IBM CICS transactions has been outsourced — put into the hands of an outside contractor. San Francisco-based OBS Companies handles all of Kinney's processing, network management and application development.

Outsourcing — turning over some or even most IS functions to outside contractors — is not exactly a new concept. In fact, for some companies like Kinney, which has been doing it since 1979, it is positively old news. For the majority of organizations, however, the idea became thinkable only when large and visible corporations such as Eastman Kodak Co. and Kendall Corp. began to publicize their plans to divest and openly discuss the cost benefits of outsourcing.

Since then, market watchers say, a lot of companies have started to think about outsourcing as a real possibility.

Radding is a free-lance writer based in Newton, Mass.



ED KASHI

**Jonopulos** says control doesn't require doing it yourself

"We've boosted our projections because of all the attention being given to outsourcing," says Jeffrey Kaplan, director of networks and professional services at The Ledgeway Group, Inc. in Lexington, Mass. Kaplan says he expects the facilities management industry, one of the major components of the outsourcing market, to achieve \$1 billion in sales in 1989 and hit \$1.7 billion by 1993.

#### Ins of outsourcing

Kaplan is not the only one picking up signals of interest. A survey of IS executives conducted in November by Inteco Corp., based in Norwalk, Conn., revealed growing interest in outsourcing, reports Harry Hoyle, Inteco executive vice-president.

The survey found that 14% of U.S. executives expect to outsource all or part of their IS operations in the near future, with the overwhelming majority of those intending to outsource only a portion. Of those favoring some level of outsourcing, 79% intend to do it within the next three years.

There is little doubt that cost reduction is the driving force behind the current wave of interest in outsourcing. Many businesses have already begun to experiment with a number of structural alternatives such as downsizing, decentralization and consolidation in an attempt to rein in IS costs and boost productivity. Outsourcing holds a special allure, however, because it offers a way to sidestep both the dilem-

ma of escalating fixed costs for information systems operation and the dizzying onrush of new technologies.

In the 1960s and '70s, when many of today's IS facilities were being built, the goal was fixed costs. With a steadily increasing volume and a fixed-cost data center, management theorized that the cost per unit would eventually decrease. Theory never really became reality, however.

"The typical IS expenditure has never gone down. Maintenance continues to require a larger and larger portion of the budget," says Adam Crescenzi, senior vice-president at Index Group, Inc. in Cambridge, Mass.

In the current economic climate, escalating fixed costs represent an unacceptable drag on the bottom line. Furthermore, with acquisitions, consolidations, spin-offs and leveraged buyouts, businesses are finding that the volume of data center activity is inclined to fluctuate widely. Managers want the flexibility to respond quickly and easily. When a division is spun off and data center volume drops, they want to cut costs incrementally.

The interest in outsourcing also coincides with the declining interest in vertical integration, by which the company owns and operates all aspects of the production chain from raw materials through production to the final sale.

To all these complexities of keeping information systems in line with business add the daunting job of reconciling system incompatibilities and a looming shortage of technical talent, and it is easy to see outsourcing as the magic bullet for the times — a chance to free up substantial capital while eliminating a management headache.

There are a couple of problems with magic bullets, though. One is that they sometimes don't turn out to be quite as potent as advertised. Another is that they sometimes have tricky ricochet patterns, especially when sprayed hastily or indiscriminately.

There is definitely some

#### INSIDE

### The people part of the equation

Page 73.

### Anticipating the questions

Page 75.

### Respectable, but not inevitable

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## Bargain

FROM PAGE 67

evidence that outsourcing can be a powerful cost-reduction device. Still, not all observers, or even all participants, buy the idea that outsourcing is the most effective way to minimize IS costs. Some contend that, over the long run, a for-profit outsourcing vendor cannot consistently deliver lower costs than a well-run internal operation. Only highly skewed contracts designed to entice companies into dismantling their internal IS departments, they argue, create the appearance that outsourcing is a great deal.

He and others contend the cost-efficiencies attributed to outsourcing are really the result of something else. For a company like Kendall, the real savings came from downsizing, not outsourcing, they suggest. The greatest cost savings at Kodak, they add, will come from consolidating five data centers into one, which does not necessarily require an outsourcing vendor.

Ron Cipolla, former Kendall IS director and architect of Kendall's current outsourcing arrangement, does not dispute that downsizing to IBM Application System/400s and decentralizing the IS function saved the company a lot of money. That, after all, was also his plan. What

cludes. The outsourcing contract closely approximated the direct cost of the in-house system. The real advantage, however, comes from increased productivity.

"With just a difference of five hours a month in [network] up-time, by the end of the year, that could mean hundreds of thousands, even millions, of dollars," Cipolla estimates. The increased uptime will mean orders are processed, shipped and invoiced sooner. As a result, customer payments are received sooner.

Kodak is less disposed to argue its points on a money basis. At least in its public statements, it has steadfastly maintained that, while cost savings were a desired end, they were not the motivating factor in its decisions to outsource on a sweeping scale. "We could have done it ourselves, but we didn't want to," says Henry Pfendt, Kodak's director of information technology. The real issues, Pfendt says, were priorities and opportunities.

First of all, Pfendt says, there is the question of whether IS, in and of itself, represents a strategic investment. "Are computer systems something strategic that management should invest in? Does [IS] build shareholder value?" he asks rhetorically.

Then, too, the company maintains that there are opportunities for both economies and advancement in "partnering with a world-class company." Speaking specifically about IBM, Pfendt refers to the arrangement as an opportunity to "leverage their infrastructure."

### 'Out' tout

Jonopulos, by contrast, is adamant in his belief that he could not possibly develop and maintain comparable systems and services in-house for a comparable price. "We re-evaluated it the last time we renewed the contract [about two years ago], and without disclosing the actual numbers, I can tell you that outsourcing cost less." Besides, he adds, the contractor has been through five computers and three data centers since 1979. Dealing with those upgrades is not a worry that he will miss.

Neither is trying to hold the line on costs for application development. "Say I have a big project that needs 12 to 16 programmers for six months," Jonopulos says. "Where do I find them, and what do I do with them when the project is finished?" With a contractor doing the work, "If they run over the budget, that's their problem."

At American Standard, Inc., Gary Biddle, vice-president of information systems and network technology, says that the company tried its hand at providing processing as a low-cost utility before deciding to outsource its data center operations. "We already had a network and com-

puter room set up as a utility, a commodity that we sold back to the divisions," Biddle says.

That approach worked well — to a point. The company got costs down to a level lower than



Kentech's Cipolla

split its data processing between two contractors, Genix Enterprises in Pittsburgh and McDonnell Douglas Computer Systems Co. in St. Louis, an arrangement that Biddle estimates has resulted in an additional cost reduction of 20% to 35%. "We got rid of the hardware. We're buying processing incrementally. We contract for an MVS platform and a number of CPU hours," Biddle explains.

For American Standard, saving money requires good capacity planning. "Most outsourcing is done at a fixed rate for a set number of hours" of CPU time, Biddle says, "but we negotiated a variable rate."

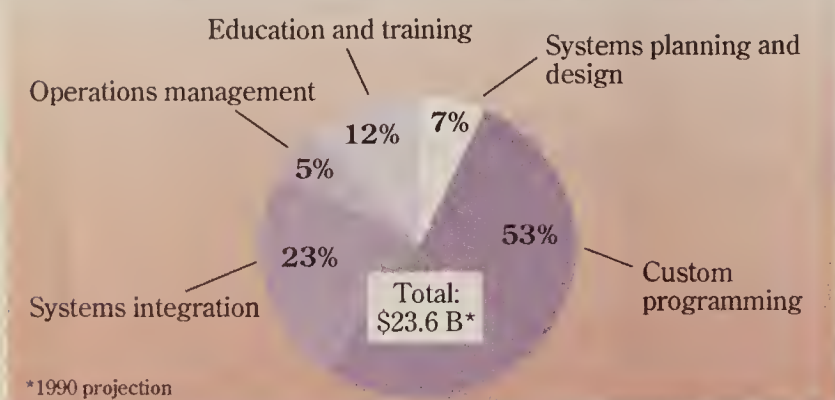
Within a target range, the more CPU time the company uses, the less it pays for each unit. If American Standard exceeds its estimate by 10% in any month (which it hasn't done so far in its 10 months of outsourcing but may do in January at year-end report time), it pays a penalty. "So it makes sense to us to manage and forecast our usage," Biddle concludes. To make this work, it is important that the vendor understand and conform to the way the company calculates CPU hours.

"You have to insist that they come back to you in your format," Biddle advises.

Although the "commonly accepted expectation is 10% to 30%," David Armour, partner in the systems management

### Slicing up outsourcing

The breakdown of U.S. spending for professional services is expected to remain the same through 1993, when the market should reach \$3.5 billion



SOURCE: THE LEDGEWAY GROUP, INC.

CW CHART: DOREEN DAHLE

Consultant Robert Walsh at the Boston Systems Group, Inc. advises his clients to proceed with care. "It's not always a good long-term solution. Costs invariably creep up the scale. As the business grows, it gets prohibitively expensive," Walsh says. "Five years down the road, you can find yourself stuck with a bad deal."

Some IS executives are also dubious about the true cost-saving potential of outsourcing. One such executive is the IS director of a large New Jersey-based chemical manufacturing company. This man, who requests that his name not be used, contends, "There is nothing that they can do that you can't do for yourself, and you don't have to make a profit."

Cipolla does say, however, is that the new arrangement, with his new company, Kentech, providing software maintenance and IBM providing network management, generates both additional savings and improved efficiency.

He estimates the savings from outsourcing of network management at \$500,000 plus, with the plus being "more user satisfaction."

When Cipolla calculates the full savings from outsourcing, he includes the subsequent savings resulting from improved performance. For instance, based on a comparison of the direct costs of network hardware, software, modems, diagnostics, personnel, overhead and administrative support, "outsourcing [the network] was a wash," he con-

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## To have and hold

**V**ery few of the 335 U.S. and European IS executives who responded to a recent survey said they expect that the need for a central IS department will disappear during the next 10 years. They said they believe a central internal core will exist to perform some or all of the following activities:

- Manage the corporation's computing and telecommunications utility.
- Manage and administer central databases accessible to all corners of the corporation.
- Operate high-volume applications.
- Set standards and policies.
- Perform IS strategic planning and opportunity finding.
- Coordinate computing efforts in business units or departments.
- Offer consulting services to departments.
- Conduct information technology research and development.

Twenty-three percent of the 243 U.S. respondents, and 33% of the 92 Europeans, reported that they were considering hiring outsiders to handle selected IS activities. Among the most frequently mentioned functions being considered were the following:

- Data processing.
- Training.
- Maintenance.
- Applications development.
- Telecommunications management.
- Systems conversion.

The survey was conducted by Index Group, Inc., a management consulting firm based in Cambridge, Mass.



practice at Andersen Consulting in Dallas, says he agrees that the amount saved through outsourcing can vary widely, depending on the details of the contract, the size of the company doing the negotiating and the volume of processing. "Every deal is a customized arrangement," Armour says.

Contract length is also a significant determinant of charges, which may account to some extent for the considerably different assessments of outsourcing as a low-cost alternative offered by companies that have approached it as a temporary arrangement.

Union Switch and Signal, Inc. in Pittsburgh is realizing some savings on IS over its previous chargeback arrangement as a division of American Standard. When the division was sold in August 1988 and suddenly found itself with no business computing capability, it did just what its previous parent would eventually do. It

turned to an outsourcing vendor. Like Biddle, Union Switch found that Genix could do the same job more cheaply — in this case, for 50% less, according to Harry Sampson, director of information systems.

Where this company and its former owner part company, however, is on the

question of whether this represents rock-bottom efficiency. Although very glad to have seen those savings, Union is sure it can do even better on its own and is already in the process of bringing its business processing in-house.

The company, a Digital Equipment Corp. OEM of signal control equipment with considerable DEC technical expertise already in-house, is installing a DEC minicomputer that will run packaged business software, a \$3 million investment expected to result in even greater savings in the long run. "The DEC platform and the packaged software don't require support so we can do with a much smaller tech group. In terms of real cash flow, it will be cheaper for us," Sampson says.

The hope of saving money was not what pushed Worlds of Wonder in Fremont, Calif., to outsourcing. When the decision was made, IS costs were scarcely more than a drop in an ocean of financial problems. The toy company, maker of Teddy Ruxpin, filed for protection under Chapter 11 in December 1987, and bank receivers took control of the company. The IS staff that managed the in-house IBM mainframe data center was trimmed to five people, while the hardware was sold or returned to the leasing company. The

receivers' actions were not really designed to trim fat. In fact, the company is spending \$55,000 a month on outsourcing out of an annual IS budget of \$1.2 million. That is \$15,000 a month more than it spent doing the same thing in-house. The decision had more to do with ensuring continuity.

of satisfaction produced.

Companies that grab for outsourcing as a panacea for an out-of-control situation are not likely to find the solution they seek.

There is always a trade-off between cost and service in the relationship between any data center, internal or exter-

## COMPANIES THAT grab for outsourcing as a panacea for an out-of-control situation are not likely to find the solution they seek.

"The managers brought in by the bank didn't feel good relying on five people who were nervous about their jobs," explains Robert Worrall, Worlds of Wonder director of MIS and one of those five people.

For peace of mind, the company turned to an outside contractor to provide processing and manage its three-warehouse network while keeping software and PC support in-house.

Worlds of Wonder emerged from Chapter 11 last May and is installing a new, in-house IBM AS/400 system that Worrall anticipates will reduce IS spending to less than half of the current budget as a result of savings in hardware, software and technical support staff.

Although large-scale use of outsourcing is currently too new to support much analysis, it does seem very likely that there is a direct correlation between the extent of choice involved in the decision to outsource and the level

of satisfaction produced. Companies that grab for outsourcing as a panacea for an out-of-control situation are not likely to find the solution they seek.

"If the company doesn't know how to manage the cost-service trade-off, then it will have problems with outsourcing," Packer warns.

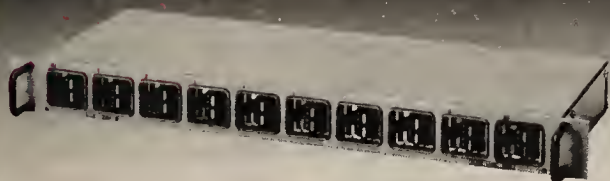
Desperation or shortsightedness may also lead some companies to divest more aggressively than is really appropriate. Most consultants seem to agree that the best course is to be selective. Dudley Cooke, president of the Executive Insight Group in Bryn Mawr, Pa., advises organizations to approach outsourcing cautiously: "It is appropriate to contract out some of your IS function, but not all of it. Once you have dismantled your IS infrastructure completely, you have no capabilities left." Instead, he says, he prefers that clients adopt the middle ground, outsourcing those functions — usually backroom processing — which a vendor can do



American Standard's Biddle

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#### Re-source-full

At American Standard, Biddle opted to outsource data processing and network management while maintaining applications development, which had already been pushed down to the business lines in-house.

"There is nothing strategic in owning hardware. How you use the information, how you apply it, is strategic. I have not given that up," Biddle says. His IS department still oversees applications development and integration — the strategic part of IS. If one of Biddle's business units wants to put up a new system, he calculates how much processing it will require and notifies the vendor, which needs 60 days to adjust its CPU capacity.

"We have 3,000 on-line terminals. Our companies run their own job streams. They get all their reports transmitted back to their printers. From the users' standpoint, nothing has really changed except the cost is lower," Biddle says.

At Kinney, Jonopulos and his assistant do not write the code, but they do design the applications. It is that element, he says, that really constitutes the heart of IS.

"We design the applications, we approve any changes, we initiate any changes we want, we review in advance any changes, and they consult with us before testing or putting anything into production," Jonopulos explains.

When a department requests a new application or a modification, Jonopulos and his assistant determine the best way to handle the job. If they decide to go ahead with a system change, he submits the request to OBS, which comes back with a cost es-

timate. Jonopulos takes the cost estimate back to the user, who then makes the final decision.

Kendall turned over a number of key responsibilities to its outside service provider — lifeblood jobs such as maintaining the commercial software it runs on its AS/400s and reviewing IS budget and project requests submitted by departments. What's



Kodak's Pfendt

important to remember here, however, is who that outside contractor is. Kentech is really Kendall's former information systems staff, including the director, spun off into an entrepreneurial mode.

"They thought about having me and two people stay, but it is hard to get a broad enough set of skills in just a few people," Cipolla says. With 10 to 12 people, Kentech has the skills to handle the required systems integration, but that is too much overhead for Kendall to justify.

Kodak is taking outsourcing further than any other major U.S. company. The company turned over operations of its data centers to IBM late last year and its PC support to Businessland, Inc. This month, the company will make a major outsourcing announcement concerning its telecommunications system, says Alan Chase, Kodak's group manager in corpo-

rate IS. Also, the company is talking with outsourcing vendors about assuming some application development responsibility.

However, there is nothing to say that what works for Kodak will work for everyone or even, at this stage, that it will prove successful for that particular company.

Pfendt says he believes that Kodak can retain the strategic value of IS without owning and operating the actual systems. He says the way the company intends to maintain control and direction is through a director of partnership relations and a high-level management board to deal with strategic issues and relationship development.

He does concede, however, that this is unknown territory that Kodak is exploring. The biggest challenge, he says, will be in managing the cross-partnership relationships. For instance, bringing a PC into the company involves the PC partner (Businessland), the networking partner and the data center partner that will provide mainframe connectivity for it. "We're still writing the book on managing these kinds of partnerships," he says.

#### Divided it falls?

There are plenty of skeptics who believe that dismantling the entire IS infrastructure can leave a company both rudderless and vulnerable.

Some worry about the disruptions and dislocations in the service market. The computer industry is littered with highly respected companies that went into the business with the best of intentions only to pull out several years later, often simply abandoning their customers.

Others point to the difficulty of changing direction once the course has been set. Outsourcing relationships can sour, warns Executive Insight's Cooke, who

is currently working on a project proposal for a company that wants to bring IS back in-house. The problem that the client faces now, he says, is the massive upfront investment required to rebuild the IS infrastructure that was dismantled several years before.

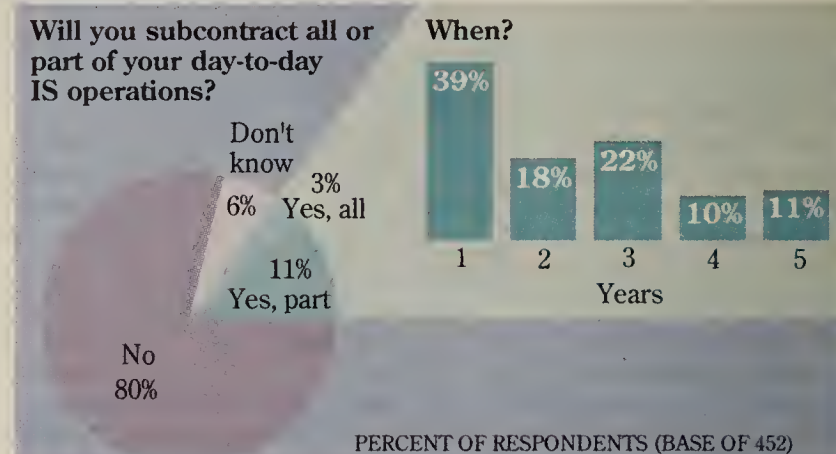
Jonopulos says he does not worry about his outsourcing relationship souring. The contract he negotiated gives Kinney a perpetual license for its applica-

The key to managing the outsourcing vendor is the contract. The contract establishes, among other things, the cost for processing at various levels of use, specifies the acceptable performance parameters, provides penalties for substandard performance and details the terms under which the relationship can be terminated.

A good contract can give you as much or more flexibility in an outsourcing arrangement as you

#### Few but fast

The majority of large U.S. firms surveyed do not plan to outsource their IS functions, but among those that do, most say they will do it soon



SOURCE: INTECO CORP.

CW CHART: DOREEN DAHLE

tions, while OBS has the right to use those applications for other clients except Kinney competitors.

"My contract calls for totally vanilla and transportable software," Jonopulos adds, so if the relationship breaks down, Kinney can readily move its applications to another processing vendor.

Biddle is also confident that he can take his applications to any MVS data center. "If the vendors don't meet the service levels specified in the contract, then I have several options. There are financial penalties, or, if it continues, I can sever the relationship," he says.

have handling all IS functions in-house, Biddle says. But constructing a good contract demands time, careful thought and personal attention. "You have to think of all the issues before the contract is written," he says, "and you have to make sure that everything you've thought of is covered." Lawyers may be helpful with the phrasing, but Biddle stresses that they should not dictate the content.

The same philosophy applies to the ongoing relationship. "You can't just relinquish control to the outsourcing vendor," Andersen Consulting's Armour says. It is up to you to "set direction and manage the results." •

## Brokers are old hands at outsider processing

While Merrill Lynch's decision to farm out its telecommunications network to MCI Communications Corp. has stirred observers to speculate about a new outsourcing trend, other financial services firms that are not as well known have been quietly outsourcing their computer operations for several years.

Leg, Mason, Wood, Walker, Inc., a \$250 million Baltimore brokerage, determined it would be more cost-effective to outsource after business screeched to a near halt in the early 1970s. Once operating an IBM 360 and employing a staff of programmers, the firm now contracts out all its processing and programming. "We feel that data processing firms are better at it than we are," says Ed Weitzel, Leg Mason's data systems administrator.

Likewise, T. Rowe Price Associates,

Inc., one of Baltimore's largest investment management firms, has relied on a mixture of contractors, including banks and service bureaus, to provide IS support since the early 1980s. "T. Rowe is an extreme example of using very little data processing for a long time," says George Goodman, the firm's former vice-president of IS.

The chief advantage of outsourcing for financial services firms comes from transforming IS from a fixed asset, which is hard to justify during business slowdowns, to a variable expense, which can easily be reduced or increased according to business requirements.

"We are not in a predictable industry," Weitzel says. "We only pay for processing on a transaction basis. So when the market is booming, we pay a higher price than when the market flattens out."

The instability of financial markets

also means there may be very little time to implement applications to take advantage of revenue opportunities. For example, trading-desk applications that provide immediate access to data about a wide variety of financial transactions can provide financial managers with key information.

"If you get the data a few seconds earlier than the other guy, you have an edge," Goodman says.

Often, outside packages or contractors can be used to capture an advantage more quickly than using in-house resources.

"Contractors can come into an organization and quickly put a system in to meet a strategic need," Goodman explains. "If the organization had a large investment in internal IS, they would hesitate to do this and, instead, wonder whether their own staff could fit in the new application in the required time

frame. Companies should not let the capability and size of their IS staffs get in the way of taking advantage of business opportunities."

The major disadvantage of outsourcing with many contractors is the difficulty of pulling together information at a single point. T. Rowe Price encountered this problem in 1985, when the company's account representatives needed to review the current status of shareholders' assets. The information resided in several places, each with its own communications environments.

The problem was solved in true outsourcing fashion. T. Rowe hired systems integrator Argos Computer Systems in New York to provide a telecommunications network hub that tied together the various types of networks and provided the information at a common point.

MICHAEL SULLIVAN-TRAINOR



# So, what do you do with the people?

BY KAY LEWIS REDDITT  
and THOMAS LODAHL

Outsourcing may offer a quick solution to intense cost pressures, but you must be prepared for the complex personnel issues that are part and parcel of the bargain.

Put yourself in the shoes of Joe Smith, data center director. One Monday morning Smith is called into his CIO's office. The reason for the summons, he soon learns, is that his company's management committee has decided to outsource all data center functions. The CIO informs Smith he will have charge of managing the transition and tells him he will be asked for input on final vendor selection.

At the moment, though, all Smith has on his mind are questions: "Why bother to ask for my input at all at this point?" he wonders. "What about my future? Is there a spot for me inside the vendor company? Will I have to relocate? What is the current job market like? Should I leave now?"

If you are an IS executive considering the possibility of outsourcing, you should be aware that those are the kinds of questions such an action will automatically provoke. And you should also know that mutually satisfactory answers are in short supply.

## Cutting the strings

Occasionally, the amputation of personnel is complete and abrupt, with employees receiving nothing more than a pink slip. More commonly, departing employees are offered some type of severance package.

In some cases, it is possible to offer all affected employees the option of joining the vendor company. Such arrangements are not the rule, however. Usually the vendor company will agree to this only if the contract is very large or if it is entering a new field or industry and wants a ready-made pool of experienced hands.

Furthermore, even if absorption is an option, transplantation is almost never completely successful. An attrition rate of 20% to 30% or more is typical during the first year, and the most qualified individuals are generally the first to leave.

One reason for the attrition is that many of the outsourced individuals have a strong professional identification with their current employer or industry.

Take, for example, the case of Fred Almy, who is now director of MIS for Apache Corp., a gas and oil independent in Denver. Almy used to work for Enron Corp., a diversified energy company based in Houston. When Enron outsourced its data center and development functions early in 1989, he shifted, along with 549 other IS professionals, onto the staff of Electronic Data Systems Co. EDS managed the migration carefully. It maintained equivalent salaries, offered comparable benefits and provided individual career counseling. Still, Almy only stayed with EDS for six weeks — primarily, he says, because "I am an oil and gas man, and I did not see my career in the IS industry."

Eastman Kodak Co. has addressed this issue by arranging a systematic rotation program with IBM. Every year, selected individuals will be rotated from IBM back to Kodak for additional personal development; others will move from Kodak to IBM for experience in partnership management.

Another possible approach is to disperse some of the high-potential IS personnel into business units or departments that need

special IS expertise. This strategy offers a couple of possible advantages. It may improve retention of critical staff, and it may serve your business interests.

The prudent CIO must worry about the long-term health of the IS function for the business, and it is a good idea to preserve some fallback resources in case it turns out that outsourcing does not meet business needs. Furthermore, some special departmental business needs may not be ad-

equately served by the service company simply because they are either too small or too specialized.

Another route that could make good business sense is the placement of some of your high-caliber people in key customer companies, particularly those with which you maintain electronic ties. The customer company benefits from acquiring an employee who is knowledgeable about the specific systems that support the relationship.

These ideas are only a starting point. It seems likely that outsourcing will become a staple in the set of alternatives for realigning IS with business goals and objectives. If this going to be the case, more and better ways of managing the impact on employees will be needed. •

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Redditt and Lodahl are president and chairman, respectively, of Cognitech Services Corp., an Easton, Conn., firm specializing in the impact of information systems on management and human resources.



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# Knowing what's outside can help, even if you're staying in

BY LARRY STEVENS

Even if you are not considering outsourcing, it can pay to make a comparison of costs between keeping operations in-house and farming them out.

As chief executives hear more about outsourcing, they start asking for numbers, particularly when they receive proposals from outsourcing vendors.

One IS manager at a Dallas-based group health insurance company says it was only a lucky chance that he happened to have all the cost figures on hand when his company's CEO received an outsourcing proposal from a service vendor.

The company, which is in the middle of merger negotiations and declined to be named, was working with Forecasting Planning Associates, a Dallas consulting company, to create a chargeback system. The work included determining cost per CPU hour, network overhead per terminal, hourly rate for programming services, operating system software license fees, DASD hourly cost, tape mounting cost and charges for I/O.

## Bid adieu

It was soon after this costing process was completed that the bid came in from an outside contractor. Because the IS manager had all the facts in hand, he was able

**B**Y INVESTIGATING the costs of outsourcing, some firms are also discovering better ways to run their operations while keeping them in-house.

to compare rates with the vendor, unit by unit, and prove that it was more efficient to keep the operation in-house. "If we hadn't had our cost figures ready," he says, "we would have had to go through the same process we go through at budgeting time. That process doesn't give us a unit cost breakdown, and it would have been much harder to compare apples to apples with the vendor."

The task of analyzing the cost of various IS activities is time-consuming but straightforward, says Gary Kirkham, executive director of Forecasting Planning. It is a matter of adding up salaries, fees and maintenance costs; amortizing hardware and software costs; and breaking the figures down into hourly units. "It's all logical," Kirkham says. "There's no magic here."

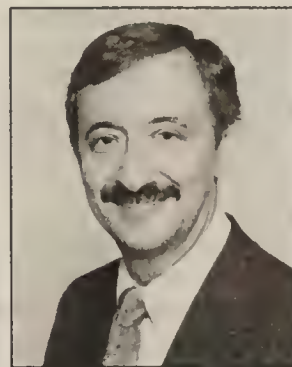
Many IS executives are not leaving the process to chance or confining themselves to self-examination. Realizing that the question of outsourcing is in the air, an increasing number are taking the initiative and — either by themselves or, more often, with the help of consultants — tallying in-house vs. outsourcing costs before being asked to do so. "A good deal of my business these days," Kirkham says, "is IS executives who want to determine

their cost relative to an outsource vendor." By investigating the costs of outsourcing, some firms are also discovering better ways to run their operations while keeping them in-house.

William M. Mercer Ltd., a pension fund management company based in Toronto, found itself in a situation about 18 months ago in which outsourcing seemed a viable alternative. According to John McClean, an executive whose primary responsibility is IS (the company does not

use titles), the firm's pricey downtown location made its 75-person data center a prime target for outsourcing. McClean says that at real estate costs of \$70 per square foot, his expanding tape and disk library was increasing data center costs precipitously.

With the help of Temple, Barker & Sloane, Inc., a consulting company in Lexington, Mass., McClean considered all the costs of running the data center in-house and compared them with quotes from outsourcing vendors. The cost analysis showed that outsourcing vendors, whose tape and disk libraries were housed in sub-



Atochem's Rubin

urban areas, could operate a data center less expensively. However, tying Mercer with an outside source would require renegotiating contracts every time the company wanted to change systems or services. This lack of flexibility led McClean to look at other alternatives.

After further calculations, the company determined it could lower its costs beyond those offered by service firms by replacing its large tape library with a mass storage disk system. Through exploring the costs of outsourcing, Mercer arrived at a

*Continued on page 77*

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## INTERVIEW

## Sometimes a great notion

**H**oward Anderson is the founder and managing director of The Yankee Group, a Boston-based research and consulting firm, which recently completed a major report on outsourcing. Anderson spoke with *Computerworld* Features Editor Joanne Kelleher about his views on this developing trend.

#### How do you define outsourcing?

Outsourcing is the ultimate form of facilities management. It is the processing of your data on my computers. It is the substitution of a variable expense — pay per transaction — for the fixed expense of a data center.

#### What are some of the specific services being offered now?

The services can include everything except financial decisions and charting the firm's technological direction. Some include on-line transaction processing, network management and control, facilities management, system design, requirements definition, software development, systems testing and support.

#### Why do you think there is currently such enormous interest in the idea?

The Kodak contract was really the watershed event. The fact that Kodak is doing this sends a message that it is OK to go to outsourcing.

#### Are you saying that no sophisticated companies did this before?

I'm saying that most of the outsourcing contracts of the past served the equivalent of "third-world" users. It is easy to look good when you can offer 5-year-old IS solutions to firms that are 10 years behind the times.

#### I presume service providers have also changed and that 5-year-old solutions aren't being offered now.

Yes, providers are of a different caliber now. Over the years, they've been developing tools and systems. They are now offering more sophisticated services.

#### But does this really make sense for the majority of companies?

Probably not. The way we see it, the modern corporation has two choices: They can either become their own internal systems integrator, or they can go to an external provider.

#### What kind of systems integration are you talking about?

Let me give you an example. One of our clients recently took on a new job running a \$12 billion company, and it was a mess. He had 17 data centers supporting seven different platforms and multiple versions of the same software. He also had 20 new mainframes that had been purchased the year before.

The point is that you can't manage anything that complex effectively. You have to simplify it — standardize on a limited number of platforms and consolidate data center operations into fewer but bigger centers to drive the transaction cost down and get the economies of scale.



In short, what this user has to do is just what a competent outsourcing vendor would do — simplify, standardize, drive the costs down and squeeze DASD.

#### Aren't most companies aware of the need to do that?

Often they are, but frequently the problem is that the demands of the profit centers convolute the equation. Senior management sends mixed messages. They tell IS to economize, but they tell the profit centers that they have P&L responsibility. Essentially, they give IS a set of rubber teeth.

So if internal politics and

#### power struggles are preventing effective utilization of information systems, outsourcing may be an answer?

Yes. Sometimes the only solution is to go outside to solve internal problems.

#### In general, when would you say it might be advisable to consider outsourcing?

Your company should definitely be interested if you haven't built to standard, if your IS productivity isn't increasing at 14% per year, if your competitors are consistently beating you to market and if your transaction costs aren't dropping by 18% per year. This is also an option to consider if you are going to substantially change the number of divisions within the company or if you are operating under severe financial pressure.

#### The percentage goals you cite for productivity increases and transaction cost reduction are very specific. How did you reach those exact percentages?

Those were the figures we found were most often cited by companies that are considered to have well-run IS operations.

#### What does a company give up if it goes to an outside source that is also a system vendor?

The most precious thing is the ability to run a vendor-independent shop.

*Continued on next page*

### COULD YOU USE OUTSIDE ASSISTANCE?

*Anderson suggests this quiz can help IS execs determine whether their operations are candidates for outsourcing.*

1. Is turnover in the IS department averaging more than 10% per year?

☐ Yes ☐ No

2. Is the growth of CPU services greater than 15% per year?

☐ Yes ☐ No

3. Are your personnel costs increasing at a rate of more than 5% per year?

☐ Yes ☐ No

4. Are your software expenses growing by more than 15% per year?

☐ Yes ☐ No

5. Are your hardware expenses decreasing by at least 10% per year?

☐ Yes ☐ No

6. Are your divisional IS expenses growing faster than corporate revenue?

☐ Yes ☐ No

7. Is your cost per CPU second decreasing at a rate of less than 14% per year?

☐ Yes ☐ No

8. Are you able to bill back all IS expenses to end users without complaint from them?

☐ Yes ☐ No

9. What percentage of your applications portfolio is less than five years old?

☐ 0-50%  
☐ 51%-100%

10. Do you pass along price discounts for off-shift processing to your end users?

☐ Yes ☐ No

11. Can your senior non-IS management (COO, CFO and

so on) explain your IS strategy?

☐ Yes ☐ No

12. What percentage of the divisional general managers would rate divisional IS as "Excellent"?

☐ 0-49%  
☐ 50%-69%  
☐ 70%-100%

13. Is the service availability of your batch network greater than 99.5%?

☐ Yes ☐ No

14. What is the average percentage of downtime for your on-line network during prime-time hours (8 a.m. to 8 p.m.)?

☐ 0-0.05%  
☐ 0.05%-1%  
☐ More than 1%

15. Can you describe the IS strategy of your company's three major competitors?

☐ Yes ☐ No

#### TALLY YOUR SCORE:

1. Yes = 10 points, No = 0
2. Yes = 10 points, No = 0
3. Yes = 10 points, No = 0
4. Yes = 10 points, No = 0
5. Yes = 0 points, No = 10
6. Yes = 10 points, No = 0
7. Yes = 10 points, No = 0
8. Yes = 0 points, No = 10
9. 0-50% = 10 points, 51%-100% = 0
10. Yes = 0 points, No = 10
11. Yes = 0 points, No = 10
12. 0-49% = 10 points, 50%-69% = 5, 70%-100% = 0
13. Yes = 0 points, No = 10
14. 0-0.05% = 0 points, 0.05%-1% = 5, More than 1% = 10
15. Yes = 0 points, No = 10

#### INTERPRET YOUR SCORE:

- 126-150 — Your operation is a prime candidate for outsourcing.  
101-125 — You are falling seriously behind and may be a candidate for outsourcing.  
76-100 — You are running a mediocre operation and probably know it.  
26-75 — Better-than-average to average.  
0-25 — You walk on water.



## What's outside

CONTINUED FROM PAGE 75

completely different answer to its question of how to handle expanding libraries.

"The way to find these creative alternatives," McClean says, "is to be aware of the areas that might be targets for outsourcing and run the numbers before you are in a critical situation."

About two months ago, Mercer came back to the question of outsourcing as a result of changes in information systems usage and demand.

Because of the increased use of fourth-generation languages in the company, many actuaries and other employees had become programmers. Serving this new force of about 150 applications developers in offices throughout Canada was becoming increasingly difficult, and standardizing software to run on mainframes, minis and personal computers was a job that required a large number of technical people.

The company figured its costs and decided to develop and control the distributed architecture in-house, using an outside contractor only to maintain the old system until the new one is in place.

Of course, it is a pointless exercise to entertain bids and compare costs in situations where there is little likelihood that outsourcing would ever be a possibility. Robert M. Rubin, vice-president of information services at Philadelphia-based Atochem NA (formed by the recent merger of Pennwalt Corp. and other firms), says that while IS management should always have a handle on the firm's technology expenditures, rarely will an IS manager need to cost-justify keeping what management views as integral operations in-house.

Robert Suh, an associate at Temple Barker, says firms are considered ripe for outsourcing when they are making critical IS business decisions, such as when their systems have reached capacity and they are considering new ones or when they are redesigning a major application. It behooves the IS manager to be alert to the possibility that outsourcing firms may come calling at these times. An overture from an outside service provider would be less likely, he adds, at less critical times, such as when the company is involved with a loan, lease or other long-term commitment.

When an IS executive does sit down to determine the internal cost of a new system and compare it with that of a service company, Suh says, he should be careful to consider future expansion. Initial utilization of new systems is often fairly low, and, unless growth projections are taken into account, a cost per CPU comparison between investing in a new system and using a contractor will be skewed by this short-term phenomenon. •

## Anderson

CONTINUED FROM PAGE 76

**System vendors can't be impartial service providers?**

Not completely. Computer vendors are less likely to give you an independent shop than a true outsourcing system supplier.

**What about outsourcing in general? What is the greatest risk element, regardless of the contractor?**

The fact that you aren't likely to be able to take the operation back inside, even if you want to.

**But some companies have tried outsourcing for limited periods of time**

and reverted to in-house operation. You can do it if it's only a small part of your operation. But it simply takes too long and costs too much to rebuild a crack IS group for your entire function.

**Any other caveats?**

Yes. It is important to understand that going to an outsourcing vendor does not and should not mean abdicating responsibility. Any company that is going to try this has to decide how to manage these third parties, and that means more than financial control.

If you really want this to work for you, you have to make sure that decisions about operating systems, data management and network management are all made jointly.

**On balance, do you think outsourcing is a good idea or not?**

I think it is a good idea for some companies, and I think that at least thinking about it is a good idea for quite a few more. If a company can't count itself among the top 20% in its industry in terms of utilization of information systems, I'd say they should at least hear some proposals, because the very act of going through the exercise will improve performance.

**How?**

It will force you to start looking at things like how systems could be combined and standardized, how much you are paying for software licenses and how staffing could be reduced and simplified. •

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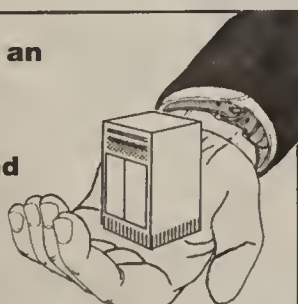
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\* The Wall Street Journal (1987) — "Survey of the Information Processing Marketplace."

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## COMPUTERWORLD

### INSIDE

Product Spotlight —  
MIS dabbles in  
electronic  
bidding. Page 59.

### Court: States may tax net traffic

BY MITCH BETTS  
CW STAFF

WASHINGTON, D.C. — A U.S.  
Supreme Court ruling last week  
allows states to tax interstate

time transaction networks such  
as airline reservation systems,  
may wind up moving their data  
centers to "tax haven" states  
that do not impose telecommuni-  
cations taxes, according to ex-  
perts.

"This will definitely affect  
site-location decisions," said  
Kenneth L. Phillips, vice-presi-  
dent of telecommunications poli-  
cy at Citicorp in New York and  
chairman of the Committee of  
Continued on page 16

### On SQL Server's test trail

BY DOUGLAS BARNEY  
CW STAFF

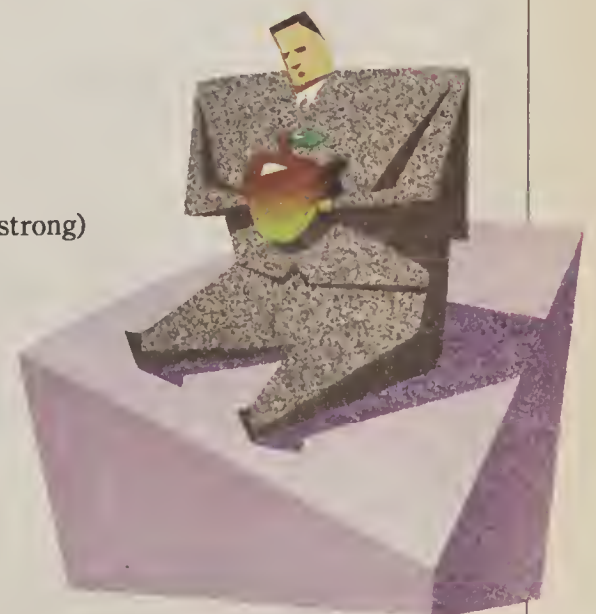
A glaring shortage of front-end  
development tools and the lack  
of product has not



## A directory of 1989 feature articles

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10/30	Raymond Boulton Alan Kamman Elisabeth Horwitt	'Hello, Europe, are you there?' London calling Mattel's European net may need upgrade





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More than likely, you've seen a few spreadsheets in your day. The problem is, on any given day you might find several in use within your very domain. One for Mac. One for MS-DOS. Even one for MS OS/2.

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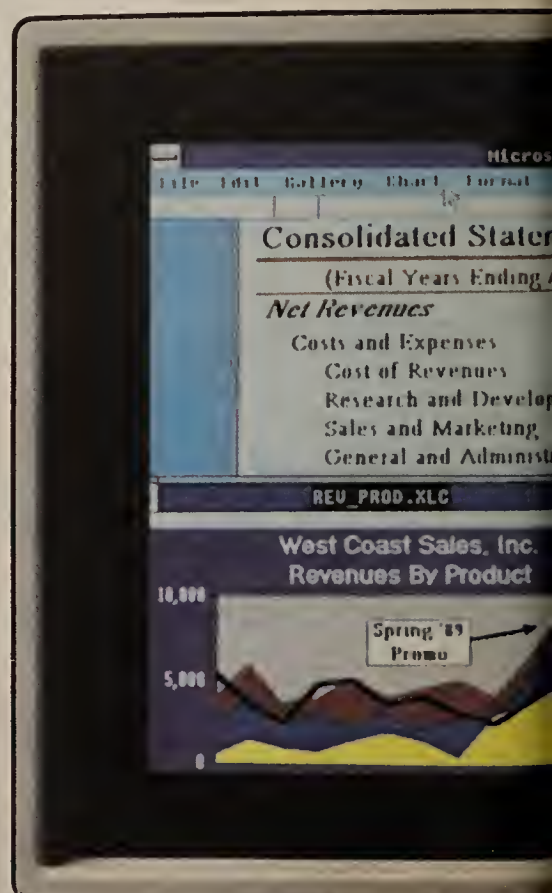
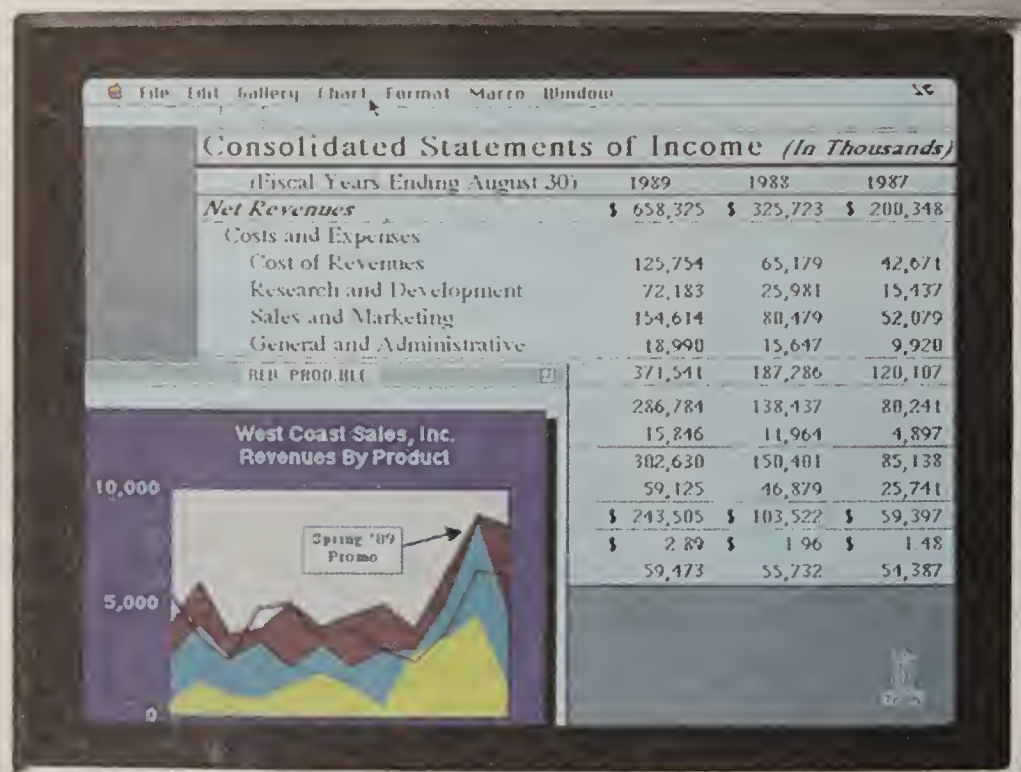


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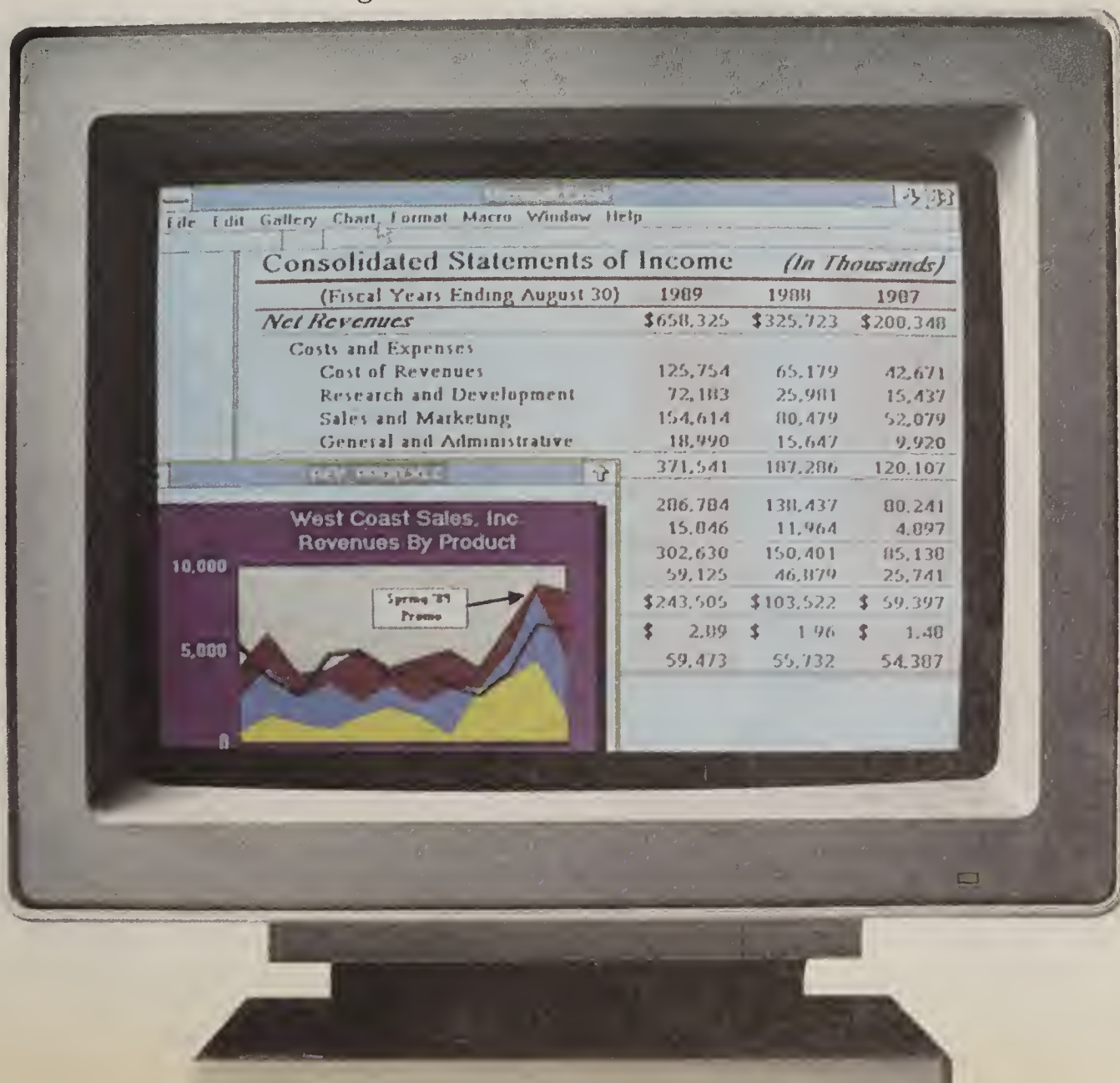
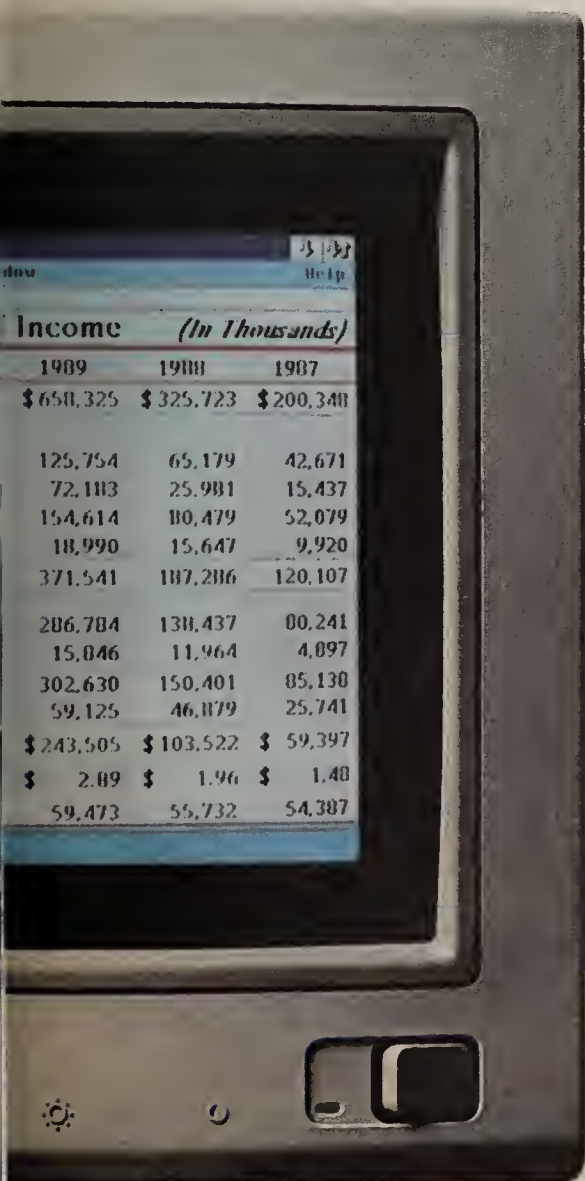
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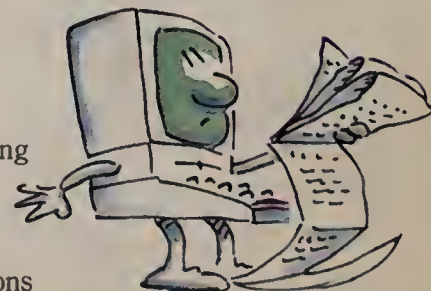
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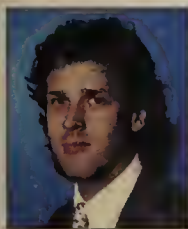


# COMPUTER INDUSTRY

## INDUSTRY INSIGHT

James Daly

### The law unto itself



Shakespeare hit the nail on the head 400 years ago: "The first thing we do, let's kill all the lawyers." Al-

though the Bard carved off that suggestion when barristers wore funny pantaloons and carried swords, the emerging legal tussle between Xerox and Apple Computer proves how valid the idea remains (see story page 97).

Xerox's \$150 million suit is a shining example of the viciously litigious state of the computer industry. Trouble is, the issues being decided this time are hazier than the Silicon Valley on an August afternoon.

Let's look at the facts. Xerox claims the graphical user interface introduced on Apple's Lisa in January 1983 and brought out on the Macintosh a year later unlawfully incorporated.

*Continued on page 97*

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- Fibronics gears up for FDDI competition. Page 96.
- 'Infoterrorism' symbolizes rash of computer suits. Page 97.

## Netmaster relocates

BY ELISABETH HORWITT  
CW STAFF

RESTON, Va. — Systems Center, Inc. is attempting to bring both the marketing and development of Netmaster under its wing — a move that could make the Systems Network Architecture network management system an even more serious threat to IBM's Netview.

Systems Center, an IBM systems and network software developer, has signed a definitive agreement to purchase the out-

standing stock of Netmaster's Australian developer, Software Developments International Pty., valued at about \$43 million. The companies expect to close the deal in the second quarter, said Richard Moore, Systems Center's vice-president of corporate communications.

In addition, Systems Center is negotiating an agreement to purchase the marketing rights to Netmaster from Cincinnati-based Cincom Systems, Inc. If the two deals go through, Net-

*Continued on page 92*

## Ranks change at NET

BY ELLIS BOOKER  
CW STAFF

REDWOOD CITY, Calif. — The appointment of a computer company veteran to its front office is a significant move for Network Equipment Technologies, Inc. (NET), according to analysts who believe that the T1 multiplexer maker is poised to match, if not best, market leader Timeplex, Inc.

Daniel J. Warmenhoven, formerly general manager of Hewlett-Packard Co.'s Information Networks Group, took over as president and chief operating officer of NET in the final weeks of 1989.

NET co-founder Bruce Smith "has a telecom background with small companies. I have a datacom background and have been involved with big companies," said Warmenhoven, who also spent 13 years at IBM in various

communications and information networking posts.

Now with 1,250 employees, NET has shown impressive growth since its founding in

*Continued on page 97*



NET's Warmenhoven wants to expand outside the U.S.

## Systems rendered

If the Reston, Va.-based company nets Netmaster, it will get a software product that looks like this:

- It is installed in 1,700 sites worldwide. In comparison, IBM's Netview is in the hands of 10,000-plus licensees, according to Framingham, Mass.-based International Data Corp. (IDC).
- It was at 2% of 8,000 VTAM sites surveyed by IDC in 1989 (Netview was at 21%).
- It is serving customers such as Covia Corp., Prudential Insurance Company of America, Dayton Power & Light and City University of New York.
- It is responsible for some 15% of current marketer Cincom's annual revenue.

## Miniscribe eyes future despite Chapter 11 filing

BY NELL MARGOLIS  
CW STAFF

LONGMONT, Colo. — Devastated by accusations of fraud and facing a host of legal plaintiffs, recently streamlined disk drive maker Miniscribe Corp. last week took a widely expected step and filed for protection under the federal bankruptcy code.

However, Chairman and Chief Executive Officer Richard Rifenburgh said 11 won't be the last chapter in the Miniscribe saga.

Referring to the filing as "unfortunate," Rifenburgh noted that "attracting the new infusion of equity capital that the company needs to take advantage of its new 7000 Series of 1-in. high, 3½-in. disk drives is impossible in the face of 13 class action and individual lawsuits."

Last month, Miniscribe un-

derwent a massive corporate reorganization that effectively bet the company's life on the Series 7000, which recently debuted to favorable reviews from market analysts. Now, the company is eyeing re-emergence. "I think they've got a shot at a comeback," said Debra Silversmith, an analyst at Boettcher & Co. in Denver. "Their time frame, I think, is unrealistic — they're talking about three to six months — but the 7000 is a good line, and there's a good chance that other companies will want to include it in their products."

Miniscribe isn't leaving it up to chance. It has hired Merrill Lynch to aid in its search for equity investors, and — subject to bankruptcy court approval — will draw on a \$20 million line of debtor-in-possession financing from its lending bank to fund a full ramp-up of the 7000 line.

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# Tactical and Strategic Planning for Information Processing Executives: What's Now...What's Ahead

January 23, 1990	New York
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# ANNOUNCING IDC'S ANNUAL CONFERENCE FOR INFORMATION PROCESSING EXECUTIVES

## THE AGENDA

9:00AM

### Welcome and Introduction

Jim Willcox, *Vice President, Sales and Marketing*

### Office Computing

Aaron Goldberg, *Vice President, Desktop Computing Research*

With the first major changes occurring in personal computing, and the strategic imperative to integrate office systems into the overall information systems architecture, there are many new planning issues. This session will examine key tactical product issues, and the new planning paradigm necessary for desktop office systems.

### Systems Software Strategies and Directions

Robert Tasker, *Vice President, Software Research and IBM Advisory*

The corporate enterprise demands a more reliable, virtually defect free computing resource at a more effective cost than ever before. The last year has witnessed the advent of several dramatically new and decidedly different choices for large scale computing architectures which expand current possibilities, from Cyclones to 4xx machines. Which are worthy of consideration? As usual, software functionality will decide the issue.

### Strategies for Case Implementations

Ed Acly, *Manager, Software Technology Service*

The inability of the vendor community to deliver the full potential of CASE has been a major disappointment to the application development professional. After more than a half decade of futility, a wave of promising new CASE products were recently introduced with advancements and enhancements promised for 1990. Expenditures for CASE tools not only represent a major corporate financial investment, but also a major political one for the CASE advocate. Which products are safer bets, and why?

### The Data Center - Highly Visible Overhead

William Strapko, *Senior Analyst, Software Technology Service*

The notion of the data center as an inviolate fixture for conducting business has never been under more pressing attack. Some corporations have elected to carry out the corporate mission without the aid of a data center. Is this a viable alternative for your company? What are the choices for reducing overhead associated with data centers? How will you respond when your CFO requests a list of "Outsourcing Alternatives"?

### Luncheon

### Midrange Systems Directions for OLTP

Richard Schreiber, *Vice President, Systems Research*

Topologies of midrange systems are transforming into an integrated, networked set of servers. Mr. Schreiber will address the cost, performance, efficiency and management issues for using these new-distributed midrange systems for OLTP applications, and the criteria to evaluate for future acquisitions.

### Large Systems Perspectives

Curt Beaumont, *Director, Systems and Peripherals Technology Service*

Mr. Beaumont will discuss the current and future positioning of large systems vendors, including system/370 and non-system/370 mainframes, and the appropriate positioning strategies for data center management. Data center management issues related to mainframe acquisition will also be analyzed. In addition, the construction of future systems architectures will be previewed.

### Storage Systems Strategies

David Vellante, *Vice President, Peripherals and Storage Research*

Mr. Vellante will review the major issues currently affecting large scale storage systems technologies and will discuss the strategies and positioning required to effectively implement storage solutions. Planning issues for Winchester, tape, and optical will be analyzed with a near, mid and long term focus.

### Networking in the '90s: Consumption and Competition

Mark Leary, *Director, Communications Research*

International standards, industry deregulation, and technology advancements have brought both chaos and opportunity to the communications industry. How can users avoid this chaos and take advantage of the opportunity? What are the key issues shaping user purchase decisions? How are vendors positioning themselves for the coming decade? Mr. Leary will present his views on networking in the '90s from the user's perspective, highlight pivotal future technologies, and outline key vendor strategies and placement

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## Netmaster

CONTINUED FROM PAGE 89

master for the first time would be marketed, developed and supported by the same vendor, Moore said.

Netmaster would provide Systems Center with an entry into integrated Systems Network Architecture (SNA) network management, which is "a wide open, largely unpenetrated, high-growth market," Moore said. Furthermore, Netmaster would complement Systems Center's own SNA performance monitoring and configuration tools, he said. Integration of the two sets of network management products is "a definite possibility, although we have no definite plans," Moore said.

One current Netmaster user, City University of New York, would like to see such integration take place, according to the university's manager of network systems, Steve Polinsky. The university now uses Systems Center's systems software and SNA program development tools, but not its network management products, Polinsky added.

The university has been "reasonably satisfied" with Cincom's Netmaster support and has some qualms about the transition to Systems Center, "although there is always room for improvement," Polinsky said.

While Cincom and Systems Center are still negotiating about the transfer of Netmaster's marketing rights, both parties expressed positive feelings about the move. "Customers would definitely benefit from getting marketing and development under one roof, and Systems Center's size and capital can put additional dollars into development," Cincom spokesman Ronald Hank said.

Cincom would get an infusion of capital that it could concentrate on its other product lines, which include database management systems for IBM, Digital Equipment Corp. and Unix systems, as well as control manufacturing software, Hank said.

## European Court decision strengthens antidumping rule

BY RALPH BANCROFT  
IDG NEWS SERVICE

LUXEMBOURG — A recent ruling by the European Court of Justice could strengthen the antidumping rules of the European Community (EC) and make it more difficult for computer and electronics manufacturers to switch production from one country to another to avoid antidumping duties.

In a case involving Japanese company Brother Industries Ltd., the court said it was up to the company to prove that the reason for shifting production of electric typewriters from Japan to Taiwan was not to evade EC antidumping duties.

After the ruling, an EC commission official said this will make it tougher on manufacturers because "it's very difficult to prove a negative." In its ruling, the court said that transfer of assembly from one country to another is not in itself a presumption that the manufacturer is trying to evade the duties. However, if there is a "timing coincidence" between when the antidumping duties are imposed and the transfer of assembly operations, then the

manufacturer has a "reasonable burden" to prove that the reason for shifting from one country to another was other than evading the duties.

But the ruling could also have implications for the EC commission's policy of enforcing strong local content conditions on foreign companies using so-called "screwdriver assembly" operations in Europe to avoid antidumping duties.

Earlier this year, the commission forced two Japanese printer makers, NEC Technologies Ltd. and Star Micronics Manufacturing Ltd., to increase the local content of computer printers that they assemble in plants in Britain. Its guideline is that 45% of the value of a product must come from locally made parts and labor to qualify the country of origin. In the Brother case, it argued that only 5% or 6% of the value was added in the Taiwanese assembly process and only the power cord and club did not come from Japan.

The court, however, effectively threw out this argument. It said the value-added criteria is of subsidiary relevance and should only be used where technical tests offer no guidance.

## HP stakes claim to fault tolerance

Hewlett-Packard Co. will pay \$5.8 million for a 10% stake in Sequoia Systems, Inc., an approximately \$31 million fault-tolerant computer maker based in Marlboro, Mass., the companies announced last week.

The marketing and technology transfer pact catapults HP into the thriving online transaction processing market, now the bailiwick of Tandem Computers, Inc. and Stratus Computer, Inc.

For Sequoia, the agreement could be a

lifesaver. The past year, in which the nine-year-old company close to doubled its revenue and logged its first profit, marked a turnaround from a streak of start-up years marred by product problems and dwindling financial resources. A choice endorsement of its Unix-based technology and a ranked player for a partner/customer, analysts said, may bolster Sequoia's chances for success — including the success of an initial public offering tentatively planned for this year.

## IN BRIEF

### High-RISC stock

Virtually every industry observer who ventured a Most Likely To Go Public list in 1989 put **Mips Computer Systems, Inc.** near the top. As the year dwindled down to days, the Sunnyvale, Calif.-based reduced instruction set computer (RISC) supplier proved them right, filing its initial public offering of 4,600,000 shares at \$17.50 per share.

### Once more, with feeling

**Oracle Corp.** last week reported second-quarter net income up 66% to \$28.5 million on revenue of \$225 million — an increase of 81% over the sales figure reported for last year's comparable quarter.

### Our man in Singapore

He did it for **Cullinet Software, Inc.** — now 49-year-old industry veteran Howard Haythornthwaite, who also logged 18 years in Europe as an IBMer and five as a Data General Corp. executive, will head up **Informix Software, Inc.**'s newly established Asia/Pacific operations out of the Menlo Park, Calif.-based company's equally new Singapore office.

### Our sale in Taiwan

The ongoing reconstitution of **Wang Laboratories, Inc.** under the aegis of founder/chairman Dr. An Wang and president Richard Miller will net approximately \$130 million for the Wang coffers if the sale of 30% of the company's Taiwan manufacturing subsidiary to a local investment group closes next week as expected.

### Pirates of penance

**Novell, Inc.** has reached a settlement in a software copyright infringement matter against **Vicom, Inc.**, a Los Angeles-based developer and reseller of medical billing packages. Novell said the settlement culminated following an extensive investigation into Vicom's practices with respect to the installation of Novell's Netware at customer sites.

### Heff's MIS man

**Playboy Enterprises, Inc.** last week promoted MIS Director John Ullrick to vice-president of MIS. Ullrick, 44, will report to Chief Financial Officer Jerry Carson. Since joining Playboy in 1987, Ullrick has moved the firm's data center from Boulder, Colo., to the Chicago headquarters and phased out a mainframe computer in favor of mid-range and PC platforms.



John Butler, Editor, has 22 years experience in field service management. He is the author of over 50 articles published in **COMPUTERWORLD**, **Desk Top Computing** and **Creative Computing**.

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- Where is the computer service industry headed?
- What you should expect from your service vendor — and how to get it.



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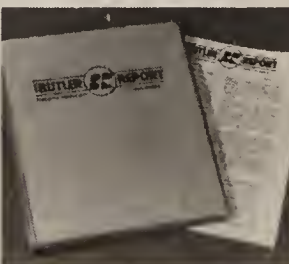
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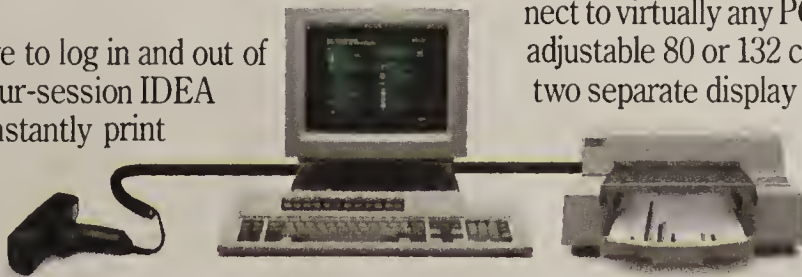


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# Fibronics prepares for battle

BY JOANIE M. WEXLER  
CW STAFF

For two years, the name Fibronics International, Inc. has carried the unofficial epithet, "The only FDDI vendor that is shipping." With its stature certain to change in 1990, the Hyannis, Mass.-based pioneer in Fiber Distributed Data Interface technology is not contemplating a year of merely resting on its leadership laurels.

FDDI is the emerging standard for 100M bit/sec., fiber-optic, token-ring local-area networks. Fibronics supplies FDDI communications products, includ-

ing network interfaces and controllers, routers and learning bridges, in addition to traditional wiring systems.

As FDDI shifts from buzzword to reality with the imminent completion of the FDDI standard, the 12-year-old fiber-optics company is closing its 1989 books with what an analyst estimates at \$10 million to \$12 million in FDDI sales and over 350 nodes installed. Preparing to do battle with advancing FDDI marketers, Fibronics recently appointed a new general manager and is immersed in a major expansion of its sales force.

Thomas Goulding, who was named senior vice-president and general manager

of North American operations just over two months ago, predicted that 1990 will bring the "toughest competitive situation" the company has ever known and anticipated that "several dozen" FDDI competitors will be shipping products by year's end.

Fibronics expects vigorous new competition from the likes of Sun Microsystems, Inc. and Digital Equipment Corp. for FDDI communications products, as well as from Fiber-



Goulding has high goals

mux in the fiber multiplexer arena, Goulding said.

Although the company declined to discuss 1989 year-end income projections, its net income for the first nine months of 1989 was nearly \$1.5 million, compared with just under \$200,000 for the same period in 1988.

Goulding said his main mission is to bring Fibronics' North American market share up to its expected 50% contribution to worldwide sales. Fibronics' FDDI

nodes are currently installed in such customer sites as Coors Brewing Co., General Electric Co., the Italian Autostrade highway system, Northrop Corp., Argonne National Labs, Mitsubishi Corp., National Aeronautics and Space Administration and the Boeing Co.

## Running up sales

Goulding, who joined Fibronics from Mobile Data International, a \$180 million division of Motorola, Inc., explained that reaching his sales goals requires expanding the company's sales and marketing staff by "well over 100%."

In addition, he said, Fibronics has aggressively pursued value-added reseller (VAR) channels, signing on 18 VARs during the last nine months.

The biggest challenge in a more competitive FDDI arena, according to Goulding, will be responding quickly to customers with pricing, product and service innovations.

"There are probably 100 vendors who have bought the chip set from AMD [Advanced Micro Devices, Inc.] to make FDDI products, so FDDI is going to be a value-added software game," said Eugene Starr, an analyst at brokerage firm Ladenburg Thalmann, located in New York.

This is not the first time Fibronics has had its work cut out for it. The company took a financial nosedive in 1987 with a \$2.8 million earnings loss after its 1986 acquisition of Lowell, Mass.-based Spartacus Computers, Inc. The deficit turned around the next year to the tune of a near \$1 million profit following the 1987 arrival of marketing-oriented President John L. Hale.

## Performance transformation

Hal Spurney, Fibronics' director of marketing, links the rocky financial performance in 1987 to transforming the company's sales force "from box peddlers to systems sellers."

Starr said that in 1986, the company's products "just weren't cost-effective," and credited the organization's financial rally to both Hale's clampdown on expenses and Fibronics' 1987 entry into the FDDI market with its System Finex LAN.

The potential impact of the recent departure of Dono Van Mierop, one of the company's FDDI directors of research and development, is uncertain, although Starr pointed out that Fibronics' vice-president of marketing, Joseph Garodnick, "has a good blend of science and marketing and will be able to carry on."

Van Mierop left Fibronics to head up FDDI development at 3Com Corp. in Santa Clara, Calif.



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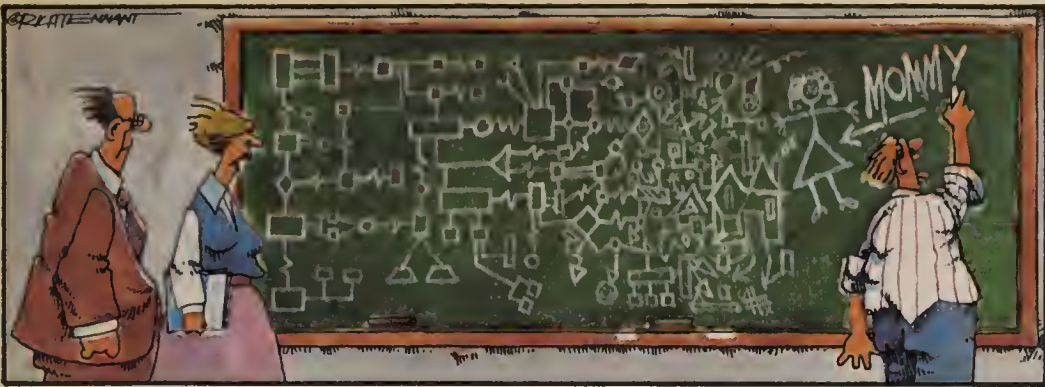


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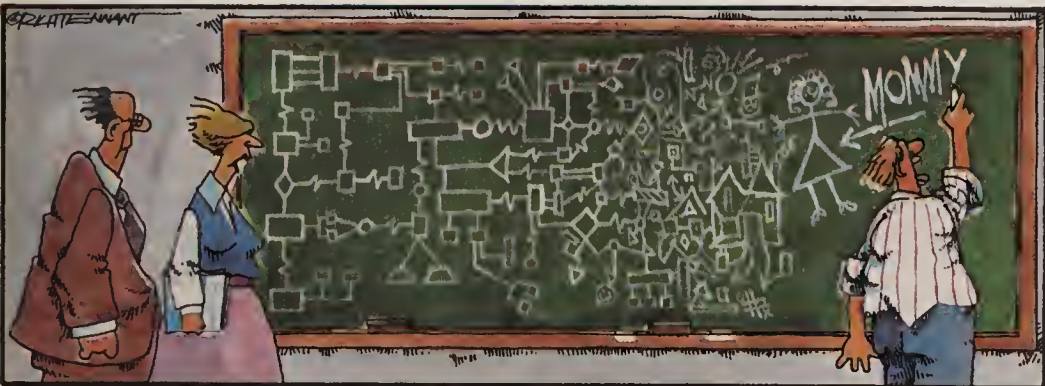
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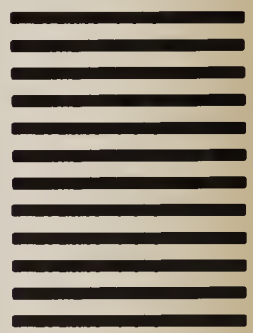
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## NET

FROM PAGE 89

1983. Worldwide revenue was \$137.7 million for the fiscal year ended March 31, 1989 — up from \$90.6 million last year and \$47.4 million in 1987. For the first six months of its fiscal 1990, ended Oct. 1, NET posted \$89.5 million, compared with \$62.4 million in the same period in 1989.

But Richard J. Malone, a principal at Vertical Systems Group, a market research firm in Dedham, Mass., said the company has "pretty much locked up" its share of big users not already being served by rival Timeplex. "The opening is Europe and the Pacific Rim," Malone said.

Warmenhoven would concur. Although he describes the NET client base as "the cream of the crop of the Fortune 500 and the Service 500," he goes on to say the challenge for the company will be to expand to European and Pacific Rim markets.

A mid-December agreement with Ericsson Business Communications AB of Sweden is "typical of the sort of things we hope to do outside the U.S.," Warmenhoven said. The agreement allows Ericsson to use NET's Integrated Digital Network Exchange and multiplexers in its private branch exchange and X.25 packet switches. The two firms also announced the formation of a joint research and development effort.

The Ericsson deal, which gives NET a presence in some 80 foreign markets and entry into European phone companies that buy Ericsson's central office equipment, complements NET's June 1987 worldwide marketing pact with IBM.

The IBM arrangement, which, like the Ericsson deal, calls for technical cooperation, accounts for 25% of NET sales overall and 40% internationally, Warmenhoven said. He added that NET will also seek to expand its sales into the U.S. regional Bell holding companies.

Currently, two of NET's largest customers are U.S. Sprint Communications Co. and MCI Communications Corp.

NET also will expand its product line through partnerships, Warmenhoven said, increasingly shifting to data communications and an emphasis on applications.

In February, it inked an OEM agreement for LAN-to-WAN solutions from Cisco Systems, Inc., a Menlo Park, Calif., maker of internetworking products for multiprotocol, multicomputer networks.

**Future NET**

Specific future NET products will include an IBM Netview-compatible management system, now in beta testing, based on IBM Personal System/2 workstations running under the OS/2 operating system. Warmenhoven said NET will also support Open Systems Interconnect-compliant network management standards.

The wide-area network vendor will introduce a DS3 multiplexer in April and have it in customers' hands next March, Warmenhoven said.

However, Tom Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J., thinks NET has mined the market of sophisticated users.

"NET needs less, not more focus on the high-end boxes," he said, adding that the firm "rode the wave of T1 popularity" but now must broaden its product line for sustained growth.

Analyst Malone agreed. For now, he said, price is driving T1 sales, but that will change in 1990, when applications will drive the market. "A lot of vendors," he said, "are struggling with this. Do their systems just support higher speed lines or do they do some postprocessing?"

Support for imaging applications — a white-hot segment of the computer applications market at the moment — could be one direction for NET in the near future and would explain why NET tapped an HP executive, Malone suggested.

## No end in sight for copyright suits

## ANALYSIS

BY RICHARD PASTORE  
CW STAFF

"Infoterrorism" is not a new tactic of Islamic Jihad or the Irish Republican Army. It is one computer executive's term for some of the intellectual property infringement lawsuits now riddling the industry like shrapnel from a pipe bomb.

Mitch Kapur, chairman of On Technology, Inc. and co-founder of Lotus Development Corp., has coined the term to describe suits like one filed

last year against several major spreadsheet software vendors [CW, July 31, 1989]. The plaintiff, Refac Technology Development Corp., is noted for buying rights to obscure technological patents and then hitting up major companies for royalty payments.

"My advice to CEOs and companies who get sued like this is you don't negotiate with terrorists," said Kapur, who has fought a few copyright skirmishes of his own. "You have to be so tough about it that they'll pick on somebody else. From everything I hear, all they're after is a fast buck."

Kapur is only slightly less vehement about the growing crop of vendor vs. vendor suits, such as last month's Xerox Corp. copyright claim against Apple Computer, Inc. [CW, Dec. 18, 1989]. "I'm very unhappy that businesses are using litigation as a business tactic," he said.

Yet some experts say this tactic is becoming more common and will continue to proliferate into the 1990s — to the detriment of small firms and customers.

In today's tough times, more individual developers are leaving their firms, some observers note. At the same time, vendors

are keeping a closer eye on their intellectual arsenals. "Combine those two property factors and you get an explosion of intellectual property litigation," said Mari Shaw, litigation chairman of the intellectual property group at Philadelphia law firm Dechert, Price & Rhoads.

However, to put things in perspective, "If you consider the size of this industry, the number of suits is relatively small," said Mark Goldberg, a partner at law firm Schwab Goldberg Price & Dannay in New York.

Still, the industry may see a growing docket of infringement cases now that recent amendments to the federal copyright laws have helped clarify the issue of software ownership. Indeed, these amendments are one

reason Xerox waited until now to challenge Apple for an alleged misappropriation that first took place in 1983.

"I don't know that anybody had any real idea back then about what could and could not be protected; it was very murky," a Xerox spokesman said in explaining the delay.

Actually, look-and-feel ownership rights remain fairly nebulous, experts noted.

"It's very hard to define what's copyrightable," Shaw said. "It will become more clear, but it's going to take more time than any of us want."

It is the courts that should do the defining, not federal legislators, experts agreed. "Any [copyright] law from Congress tied to technology at a specific point in time would be stretched to the breaking point by the next generation of technology," Goldberg noted.

Ownership rights in this industry are so complex that some fringe vendors exploit the confusion to ship knockoff products. "There are some companies that

say, 'They're never going to come after us, we're too minor. Let's go for it,'" Shaw said.

But more often, small companies just do not understand the depth and breadth of intellectual property rights, Shaw observed. "They fail to realize they are violating somebody else's rights," she said.

In some court battles, small companies and users get caught in the cross fire. The enormous legal fees required to defend a suit can often obliterate a small firm, Shaw said.

Also, "the fear of a lawsuit certainly stifles innovation" among small firms and start-up shops, added Nancy McSharry, an analyst at International Data Corp., a Framingham, Mass.-based market research firm.

Consequently, users may face fewer vendor and product options and less price competitiveness, McSharry said.

**FUD factor**

Users also suffer shivers of uncertainty and disillusionment when major vendors drag one another into court. "It does make you lose a little sense of integrity," said David Dandro, vice-president of information systems at Emhart Corp. in Hartford, Conn. "You expect companies to act in a fashion that doesn't violate the principles and morals of business."

Other users are concerned about the suits' effect on their wallets. If Refac or Xerox win their cases, some said they expect the defendants to try to pass on any royalty costs to customers.

On the other hand, the blow to large firms and the industry as a whole is cushioned by vendor prudence. "Deep in their heart of hearts, all these guys understand that they have to live with each other," Kapur said. "None of them is going to go on a kamikaze mission; the health of the overall industry is the most important thing."

## Daly

FROM PAGE 89

ed "material" developed by Xerox in the late 1970s and early 1980s. Fair enough.

For years, Apple glowingly told the story of how a boyish Steve Jobs visited Xerox's Palo Alto Research Center, fell in love with what has become known as the company's Star interface and its concepts of windows and mice, then dashed off to build a legend.

Sounds like a pretty solid case if this were 1983, 1984 or even 1985. But the so-called crimes happened seven years ago, while Ronald Reagan was still blissfully napping through

Cabinet meetings and "Silver Spoons" seemed like a good idea for a TV series.

Nowhere does Xerox explain the delay in the lawsuit, nor does it charge Apple with copyright infringement. Xerox wants one thing: cash, and lots of it.

So where does this Rip Van Winkle offense come from? Xerox says it stems from recent clarifications in software laws. But the smell of money also fills the air. Perhaps ex-IBMer Bill Lowe lit a fire under the company's legal bloodhounds. Now that the industry seems to be moving toward a standard in the graphical user interface department, the time seems right to cash in.

While Apple is expected to

make hay out of the Xerox delay, it is also caught in the devilish position of publicly talking out of both sides of its mouth. Apple is still hip-deep in a lawsuit that

**A**LTHOUGH either Apple or Xerox will emerge victorious, both are losers because both are public laughingstocks.

claims that both Microsoft's Windows and Hewlett-Packard's New Wave trampled the copyright of the Mac interface — the

same interface Xerox claims Apple never owned.

Apple has a long history of advancing copyright laws, but now it's being shot at with its own ammunition. Apple attorneys must split a legal hair so fine as to be practically transparent, arguing that Microsoft and HP infringed on Apple's "expression" of ideas, but it in turn only "incorporated" Xerox's ideas, and ideas are not copyrightable.

Is your head spinning yet? Join the crowd. Mitch Kapur, former chairman of Lotus and no stranger to a courtroom showdown, sees it this way: "This is not a battle where there is moral righteousness on one side and evildoing on the other.

It's a big company trying to press business advantages."

Amen. Although either Apple or Xerox will emerge victorious, both are losers because both are public laughingstocks. Xerox looks both sleepy and money-grubbing, while the excessively litigious Apple has been left to twist in the wind by the rest of the industry.

The hackers on the bulletin boards offer neither empathy nor defense. Professional associates have shrugged their shoulders.

After setting up the rules, Apple must now play by them. And that always hurts.

Daly is a *Computerworld* West Coast senior correspondent.



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# COMPUTER CAREERS

## Planning to be a businessman?

*If so, marketing and sales have grown into essential areas of knowledge*

BY WALTER J. POPPER  
SPECIAL TO CW

In today's competitive business environment, with every company determined to be market-driven and customer-focused, the closely related functions of marketing and sales are receiving increasing attention in the area of systems development.

Along with finance and operations, marketing and sales are among the aspects of business that every systems professional should understand.

Each of the areas contributes in a unique way to the business enterprise; each, in turn, presents special opportunities for the use of information and information technology.

### A different way

Marketing gurus such as Tom Peters, co-author of *In Search of Excellence*, have argued for years that the way to understand a business is from the customer's point of view.

Many excellent firms put that principle into practice. Clothing manufacturer Nordstroms, Inc. makes customer service come alive with entertainment, refreshments and flawless personal attention. For Proctor and Gamble, the magic comes from finely tuned brand management, with

every aspect of a product — name, package, features and price — monitored in minute detail. IBM invests in a best-in-class sales force.

The fundamental concept in marketing is that of economic value. The idea is that the firm's sole reason for existence is to provide, in a competitive environment, products and services that address specific customer needs.

Understanding value implies a knowledge of customers and the world in which those customers live. What is most critical in marketing is the ability to recognize the needs of the customer before one's competitors and, ideally, even before the customers themselves. The successful firm is able to translate this recognition into product or service features that customers are willing to pay for.

Marketing people then establish a pricing structure, set up channels of distribution and represent the firm's offerings through advertising and promotions.

Of course, understanding individual customers is not sufficient. The marketing organization must be prepared to deal with aggregates — the firm's market segments — and to aim

the resources of the firm toward production of the optimal product/service mix for each segment.

Information about a firm's customers — what they buy, how much, when and in what combinations — is the critical element in market segmentation. Getting information that is current, accurate and easily analyzed and communicated is a primary concern of any marketing organization. For this reason, information technology is an essential tool for marketers.

Each industry has unique platforms for gathering customer information: point-of-sale terminals in retailing, reservation systems in travel, credit-card processing in banking and order entry or electronic data interchange in manufacturing. The critical issue for marketing is whether the data will be used simply to initiate a transaction or will be available in a customer database for subsequent use.

If the job of marketing is to understand or anticipate customer needs and position the firm and its products to meet the demand, the job of sales is to execute the marketing strategy by establishing and maintaining customer relationships and com-

pleting repeated sales within these relationships. This function is information intensive and has come to depend increasingly on the use of information technology.

Common sales applications range from the automation of such routine clerical tasks as or-

difficult — tasks facing groups developing applications for these areas. Unless the applications are built with attention to the differences between the sales and marketing groups, they will never be fully used and indeed may never be built.

In the lodging industry, for

**U**NLESS THE APPLICATIONS are built with attention to the differences between the sales and marketing groups, they will never be fully used and indeed may never be built.

der entry and call reporting to the enhancement of a salesperson's ability to customize a product or service at the customer's site. For example, a salesman of automotive paint would call on his customer, a body shop, with paints and a computer system for matching hundreds of makes and models with thousands of custom-blended paints.

Marketing and sales are frequently assumed to be the same thing. In fact, the functions are quite different, as are the cultures which tend to grow up around each of them. Understanding these differences is critical, particularly for systems professionals responsible for applications that help coordinate the functions.

Providing marketing and sales with common views of customer data is one of the most important — and one of the most

example, corporate marketing departments and local sales managers used to argue endlessly about room rates. Today, armed with a common view of occupancy data and an agreed-upon algorithm for yield management, they can agree on rates and focus on promotions instead.

Marketing and sales, along with operations and finance, are areas to which few information systems professionals gave serious attention in the past. Today, management will overlook deficiencies in business knowledge only for a few "wizards" who are critical because they know a vendor or a methodology or hold the status of guru in a critical technology.

Popper is a vice-president at Index Group, a Cambridge, Mass. management consulting firm specializing in information technology.



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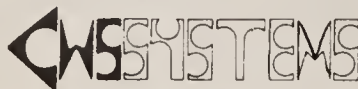
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## Computer Consulting Group

Contract Professional Services

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(803) 738-1994  
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Call Marle Clark at 1-800-521-2144, or forward your resume to: MIS International Corporate Headquarters, 445 Enterprise Ct., Bloomfield Hills, MI 48013, Fax #: (313) 253-9506. Personal interviews in Atlanta, GA or Huntsville, AL can be arranged upon request. Equal Opportunity Employer.

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All the information you need is right here. Just call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700). Or, if you want, you can send us the form below via mail or to our FAX machine. You can reach our FAX at ext. 739 or 740 at either of the above numbers.

The following information will help you determine the size ad you'd like to run and when you'd like to run it.

**CLOSING DATES:** To reserve space, you need to call us by 5PM (all continental U.S. time zones), 6 days prior to the Monday issue date. We need your ad materials (camera-ready mechanical or copy for pub-set ad) by 5PM, 5 days prior to the weekly issue.

**AD COPY:** We'll typeset your ad at no extra charge. You can give us copy via phone, U.S. mail, or FAX. To typeset an ad for you, we need clean, typewritten copy. Figure about 30 words to the column inch, not including headlines. (There are seven columns on each page.)

**LOGOS AND SPECIAL ARTWORK:** Any logos or special artwork should be enclosed with your ad copy. For best reproduction, please send us either a stat of your logo or a clean sample on white bond paper.

**COLUMN WIDTHS AND MINIMUM DEPTHS:** Your ad can be one of seven different widths. There is a minimum depth requirement for each width. You can also run larger ads in half-inch increments. The chart below can serve as a reference.

NUMBER OF COLUMNS	WIDTH	MINIMUM DEPTH
1 column	1-1/4"	2"
2 columns	2-5/8"	2"
3 columns	4-1/16"	3"
4 columns	5-9/16"	4"
5 columns	6-15/16"	5"
6 columns	8-3/8"	6"
7 columns	9-3/4"	7"

**RATES:** Your rate will depend on the size of your ad and whether you choose to run regionally or nationally. The national rate is \$14.85 per line or \$178.20 per column inch. The regional rate (Eastern, Midwestern or Western editions) is \$10.80 per line or \$129.60 per column inch. You can run your ad in any two regions for \$13.50 per

line or \$189.00 per column inch. In all cases, you can earn volume discounts.

The minimum ad size is two column inches (1-1/4" wide by 2" deep) and costs \$415.80 if run nationally. A sample of this size appears below. You can run larger ads in half-inch increments at \$103.95 per half inch. Box numbers are available and cost \$25 per insertion (\$50 if foreign).

## Programmer Analyst

This is a sample ad for Computerworld's Computer Careers section. It will help you decide what size ad you'd like to run. Remember that you can run your ad either regionally or nationally in our recruitment section and that the minimum ad size is one column (1 4/16 inches wide) by two inches deep (like this sample). This ad would cost \$415.80 in our national edition, \$302.40 in the Eastern, Midwestern, or Western edition, and \$378.00 in two regions; volume discounts apply.

**SAMPLE AD SIZES AND PRICES:** To assist you in planning your recruitment advertising, the following shows common ad sizes and their respective costs.

	One Region (East, Midwest or West)	Two Regions (East/West East/Midwest, Midwest/West)	National Edition
1 column x 2"	\$ 302.40	\$ 378.00	\$ 415.80
2 column x 2"	\$ 604.80	\$ 756.00	\$ 831.60
3 column x 3"	\$1,360.80	\$1,701.00	\$1,871.10
4 column x 5"	\$3,024.00	\$3,780.00	\$4,158.00
5 column x 7"	\$5,292.00	\$6,615.00	\$7,276.50

**PAYMENT:** If you're a first-time advertiser or if you haven't established an account with us, we need your payment in advance (or with your ad) or a purchase order number. Once you have established an account with us, we'll bill you for any ads you run as long as your payment record is good.

**COMPUTER CAREERS NETWORK BUYS:** You can take advantage of special rates that let you run your ad in *Computerworld* and *Computerworld's* sister newspapers at special rates. Choose from *Computerworld Focus on Integration*, *Network World*, *InfoWorld*, *Digital News* and *Federal Computer Week*. Call for details.

## Computerworld Recruitment Advertising Order Form

Ad Size: \_\_\_\_\_ columns wide by \_\_\_\_\_ inches deep

Issue Date(s): \_\_\_\_\_

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Region: ☐ East ☐ Midwest ☐ West ☐ National: ☐  
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Send this form to: **COMPUTERWORLD RECRUITMENT ADVERTISING**  
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Should be skilled in analytical problem solving and efficiency techniques. Must be good organizer and planner, with the ability to communicate effectively with both technical and non-technical personnel.

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Software Engineer II responsible for participating in development, testing, documentation, and maintenance of knowledge-based expert systems. Includes the generation and debugging of coded configuration rules, preparation and data-entry of associated configuration information into databases, and integration into existing knowledge base. Responsible for knowledge acquisition in hardware configuration domain, knowledge representation, and design and development of expert system. Translate domain rules and heuristics into expert system's knowledge base. Design, implement, and test OPS5 code and create data representations to be added into expert system's template and component databases. Contribute to the design and implementation of representations and mechanisms. Prepare plans, documentation, and status reports. Requirements for this position are: a Master of Science in Electrical Engineering or Computer and Information Science; knowledge of Artificial Intelligence, Software Engineering techniques, expert systems, knowledge representation, knowledge acquisition, databases, and OPS5. Salary: \$35,506 to \$38,000 per year. 40 hr/wk. 8:15-5pm. No exp. req. If you are interested in, and qualified for the above position, please forward your resume to: Attention: Job Order #00212, Massachusetts Department of Employment and Training, Special Programs Unit, Charles F. Hurley Building, 19 Staniford Street, Government Center, Boston, MA 02114.

### Data Processing

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Anchorage, Alaska

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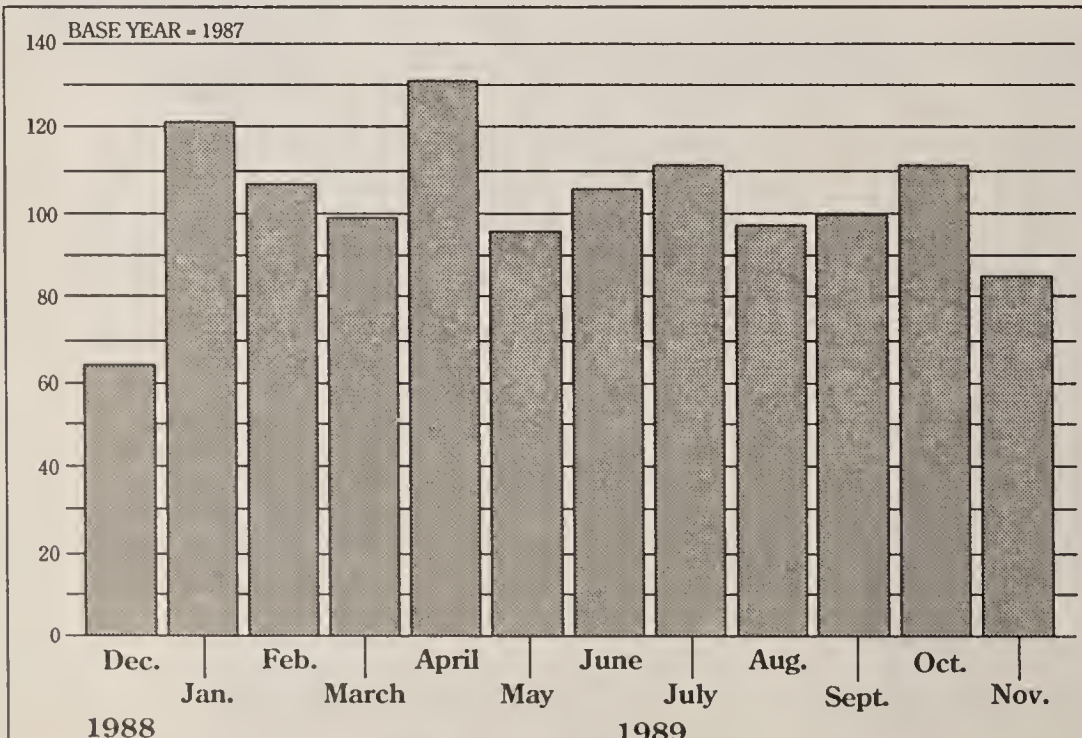
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# CAREER INDEX

## Computer recruitment advertising index\*



\*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

SOURCE: CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATABASE

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Data Processing

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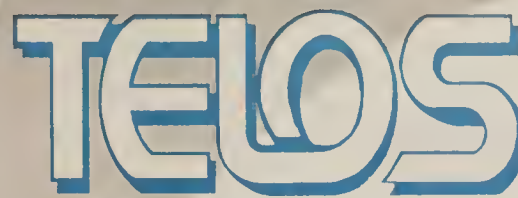
Data Processing

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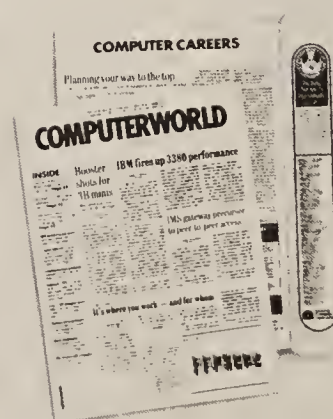
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## From small nags to glitches

*The right contract can keep you from losing your shirt in a system crash*

BY RAYMOND T. NIMMER  
SPECIAL TO CW

**W**hat if a system fails? We have all thought about this question, but most of us have never experienced a total failure. We frequently suffer the pain of seemingly random bugs or nagging inadequacies. The system never works exactly the way it should work, but somehow it avoids crashing.

The upshot is that the buyer often bears the brunt of any cost and confusion resulting from small defects unless the seller voluntarily takes back its system. For example, if a retailer sends a customer the wrong merchandise because of a bug in the program that controls its shipments, the complaints go to the retailer. If a company does not pay a supplier because of a problem with its accounting system, the letter demanding payment goes to the company that is using the accounting software.

In an ordinary transaction, a

party purchasing a system has the right to expect that bugs will be infrequent and minor. It has a right to insist that the seller disclose any known bugs. The buyer can demand that the seller help eliminate a bug.

However, the seller has rights, too. It can expect that the buyer will live with some flaws in a program rather than show up at its door with an angry attorney. If the buyer expects more, the agreement between the two parties must outline it specifically.

Software and hardware companies survive or fail on the basis of their reputations, and a vendor's reputation should be the buyer's first line of defense. Informal user networks and published reviews of technologies relate how well systems and software work. As a result of these resources, a developer who consistently delivers products with too many flaws will not survive. By the same token, a buyer who does not use these resources before acquiring a system is simply flying blind and takes the risk of running into problems.



However, these resources generally provide protection only when you are purchasing a product that has a track record or that has drawn the attention of evaluators. However, there are many programs, networks and hardware systems that do not fall into this category. Furthermore, for every flawed system that is marketed, someone was the first to discover the flaws, often through a painful experience.

### Addressing serious flaws

Who has responsibility for flaws and mistakes in a computer system when the problems are serious? The answer depends on the type of deal that you make. The contract should determine whether and to what extent the buyer is covered for these problems.

To protect the buyer, a system contract should answer five questions:

1) **What happens if the system never performs at all?** Often, the buyer should not be required to pay any part of the purchase price, and the system developer should refund any prepayments. However, in some transactions, the system developer might incur substantial costs, and the buyer might agree

to pay for some or all of the time spent in development even if the system never works.

2) **What happens if the system performs for a while and then crashes entirely?** Some sellers will argue that their responsibility ends when the system is delivered and performs up to initial standards. The problem, of course, is that many flaws in a complex system are not discernible until the system is used for an extended time.

3) **What happens if the system performs for a while but crashes after the buyer modifies it?** Does the buyer's tinkering remove all responsibility from the seller, or must the parties try to determine whose mistake caused what problem? In a complex system, it may be impossible to make that determination. Many sellers disclaim any responsibility for any problem if the buyer changes the system in some way.

4) **What happens if a defect for which the seller is responsible causes serious and substantial loss to the buyer?** Is the seller responsible for all the buyer's lost time, lost accounts and lost profits? Or is the seller only obligated to repair or replace the program and, failing that, to refund the purchase price?

5) **What happens if the system crashes and harms a third party?** You, as the user of the system, will wind up paying the third party, but can you get

your money back from the system provider?

Contracts take as many different positions on these issues as one can imagine. Most sophisticated vendors pay close attention to the need to limit their responsibility in all five situations. Few willingly agree to pay for lost profits or to indemnify the user for injuries to third parties. However, some of them will accept this responsibility, and some buyers can insist that they do so.

The greatest problem is when the contract says nothing about responsibility or when one of the parties does not understand what the language of the contract really means.

Nimmer is Foundation Professor of Law at the University of Houston, counsel to the law firm Sheinfeld, Maley & Kay and author of *The Law of Computer Technology* (Warren, Gorham & Lamont, New York).

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	Closing price	Recent high	Recent low
IBM PC Model 176	\$550	\$600	\$400
XT Model 086	\$800	\$1,100	\$700
XT Model 089	\$900	\$1,200	\$800
AT Model 099	\$1,450	\$1,600	\$1,300
AT Model 239	\$1,825	\$2,000	\$1,700
AT Model 339	\$1,825	\$2,000	\$1,700
PS/2 Model 50	\$1,700	\$1,900	\$1,500
PS/2 Model 60	\$2,700	\$2,825	\$2,500
Compaq Portable I	\$645	\$750	\$550
Portable II	\$1,700	\$1,725	\$1,550
Portable III	\$2,300	\$2,875	\$2,100
Portable 286	\$1,900	\$2,000	\$1,600
Plus	\$750	\$950	\$675
Deskpro 286	\$1,675	\$1,975	\$1,600
Deskpro 386	\$2,475	\$2,750	\$2,475
Apple Macintosh 512	\$555	\$800	\$550
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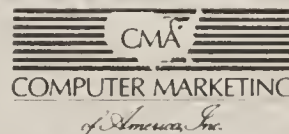
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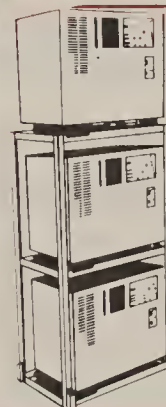
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# TRAINING

## The top guns of training

*The perfect trainer — or even an approximation — is a class act*

BY MARK DUNCAN  
SPECIAL TO CW

Chances are that the perfect trainer — let's call him or her the "PT" — does not exist. However, many trainers come close enough. Look for the following qualities, characteristics and skills in your quest to net this rare species.

• **Articulate.** The PT's greatest asset is probably his eloquence. His sentences are measured, balanced and complete, and he is never monotonous. His voice has the range, volume and variation of a gifted and enthusiastic storyteller. His command of English enables him to capture and retain undivided attention. His diction has an aural pleasure; his vocabulary is wide-ranging and accurate. He rarely has to struggle for the proper word.

• **Rapport.** The PT begins building rapport with his students from the moment he en-

counters them. He will talk to the earlybirds who drift in before class and continue building rapport in a preamble before class actually gets under way.

He will determine an audience's collective sense of humor, size up potential rascals, saboteurs and mischief-makers and note the serious-minded and diligent, identifying the students who are there by desire and the ones who are not.

His disarming and pleasant demeanor will encourage questions and conversation even from reserved personalities.

• **Knowledgeable.** The PT will not need to refer to a manual before furnishing a satisfactory answer.

Furthermore, his answers and explanations are readily illustrated by realistic, appropriate and easily comprehensible examples built from experience in his field, not simply from theory.

• **Adaptable.** While meticulous preparation is of paramount importance, the PT adapts to dif-

ferent training scenarios, expected or otherwise, changing pace, agenda and style. Periodically, he will subtly check the pulse of the class to determine whether he is fulfilling their objectives.

• **Competent.** The PT exudes an air of competence while providing an appropriate degree of personal attention. He not only knows his subject matter but is also a skillful facilitator. His people skills enable him to handle classes of varying sizes and abilities. He gives the air of complete control without being overbearing, dictatorial, regimental or megalomaniacal.

If the audience is unresponsive and apathetic, he can inspire it with almost televangelistic intensity. If a saboteur is at work, the PT isolates and neutralizes him with one of a number of weapons in his arsenal. The class is well managed, yet students have the feeling of adequate freedom for questions, observations and conversation.

The PT will tolerate digressions — he may even start them — but he will always shape them

to a purpose. He is capable and confident because he possesses a consummate blend of innate ability and pertinent experience.

• **Presence.** Even before demonstrating his skills, the PT's image and demeanor create a presence that invites respect. The PT balances the roles of teacher, motivator and facilitator to remain the nucleus of the group yet foster an air of camaraderie.

He is never condescending; his manner eliminates tension and quells anxieties, allowing students to concentrate on learning.

• **Entertaining.** No one can consider himself a PT if he does not entertain. Stripped of its physical trappings, the environment of teaching and learning is a fairly dry one: one person imparts knowledge; another absorbs it.

The information is sometimes interesting enough to command attention in its own right, but only for so long. Undiluted, it eventually becomes too hard to swallow. The PT supplies the missing ingredient, the perfect chaser — fun.

Learning without being entertained is hard work. The PT entertains without diminishing the seriousness of the training objectives. He is witty — but his wit is not without wisdom. He is

humorous — but his humor is in good taste.

The PT practices his unique brand of entertainment with intelligence, aplomb and propriety. His burgeoning popularity is a measure of how well he succeeds.

• **Altruistic.** To the PT, training is not simply a job. He is truly a champion for education. His motives transcend the urge for fame and fortune, though being a PT, these rewards become his just desserts! He believes few things are as noble as teaching and educating others, broadening their minds and equipping them for better performance.

This belief also makes the PT an altruist. He is not out to prove anything. He is a PT because that is what he wants to be, and it is what he does well.

Look around at the trainers you know. How popular and successful are they? How well do their peers recognize and respect them? How valuable are they to their organization?

Chances are, the perfect trainer does not exist. But if you know a trainer who is popular, successful, recognized, respected and valued, he or she may come close enough.

Duncan is a quality assurance consultant at a large Dallas bank.



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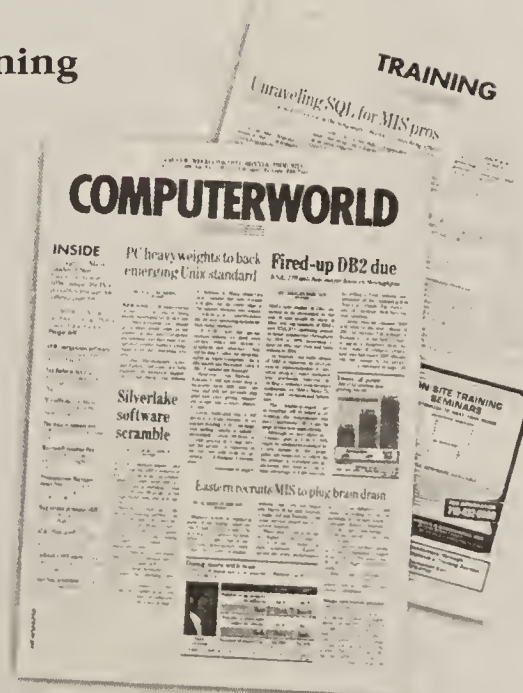
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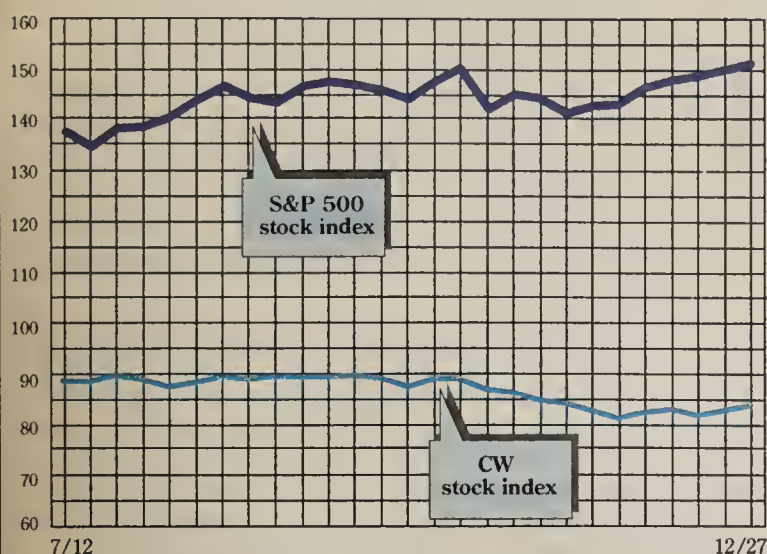


**COMPUTERWORLD**

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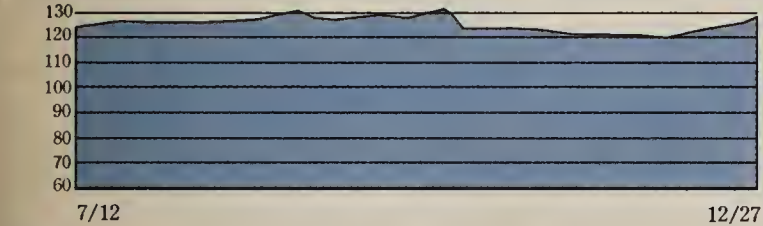


# STOCK TRADING INDEX

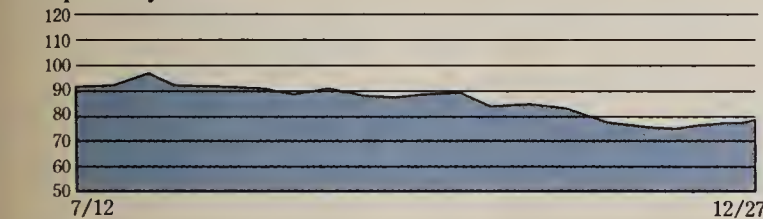


Indexes	Last Week	This Week
Communications	125.3	129.7
Computer Systems	77.2	79.4
Software & DP Services	116.8	120.1
Semiconductors	50.6	52.6
Peripherals & Subsystems	68.9	73.0
Leasing Companies	94.0	95.0
Composite Index	81.6	84.4
S&P 500 Index	148.3	151.7

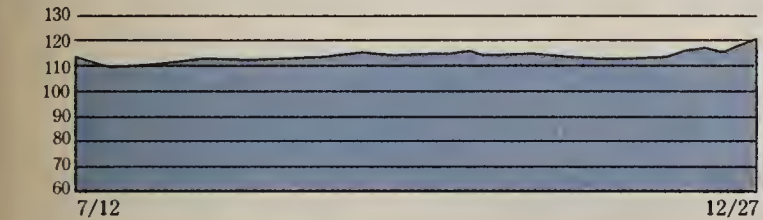
## Communications



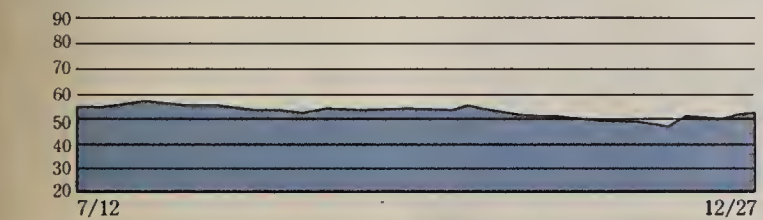
## Computer Systems



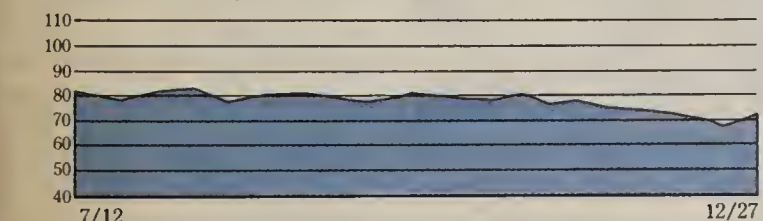
## Software & DP Services



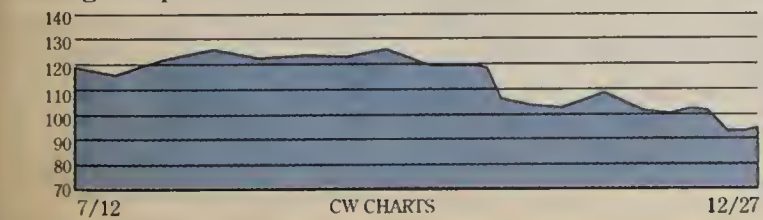
## Semiconductors



## Peripherals & Subsystems



## Leasing Companies



# Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JAN. 3, 1990

EXCH	52-WEEK RANGE	PRICE JAN. 3, 1989	WEEK NET CHNG	WEEK PCT CHNG
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## Communications and Network Services

N	AMERICAN INFO TECHS CORP	68 47	66.75	0.0	0.0
Q	ANOREW CORP	26 18	25.75	0.8	3.0
Q	ARTEL COMM CORP	9 2	7.125	0.9	14.0
N	AT&T	47 28	46.125	1.5	3.4
Q	AVANTEK INC	7 4	4	0.0	0.0
N	AYDIN CORP	21 14	16.25	0.3	1.6
N	BELL ATLANTIC CORP	114 70	113.75	4.6	4.2
N	BELLSOUTH CORP	59 39	58.75	1.5	2.6
Q	COMPRESSION LABS INC	11 3	10	1.6	19.4
Q	CONTEL CORP	37 20	35	1.9	5.7
Q	DATA SWITCH CORP	6 2	3.75	0.4	11.1
Q	DIGITAL COMM ASSOC	26 17	20.625	0.6	3.1
Q	DYNATECH CORP	21 16	17	0.3	1.5
Q	FIBRONICS INTNL INC	7 4	6.125	0.3	4.3
Q	GANDOLF TECHNOLOGIES	7 4	5	0.5	11.1
N	GENERAL DATACOMM INOS	7 4	4.625	0.1	2.8
N	GTE CORP	72 43	71	1.8	2.5
N	INFOTRON SYS CORP	13 8	8	-0.3	-3.0
N	ITT CORP	65 50	59.375	0.6	1.1
N	M A COM INC	9 5	5	0.1	2.6
Q	MCI COMMUNICATIONS CORP	49 22	43.125	0.4	0.9
Q	NETWORK EQUIP TECH INC	32 17	30	0.1	0.4
Q	NETWORK SYS CORP	11 7	8.125	0.3	3.2
Q	NORTHERN TELECOM LTD	24 14	24.125	0.8	3.2
Q	NOVELL INC	38 24	33	1.8	5.6
Q	NYNEX CORP	92 65	89.5	-0.3	-0.3
N	PACIFIC TELESIS GROUP	52 31	50.625	1.4	2.8
A	PENRIL CORP	9 3	7.25	0.6	9.4
N	SCIENTIFIC ATLANTA INC	25 13	24.625	2.1	9.4
N	SOUTHWESTERN BELL CORP	65 39	63.625	1.3	2.0
Q	3 COM CORP	29 10	13.375	-0.5	-3.6
N	US WEST INC	81 57	79.75	1.5	1.9

## Computer Systems

Q	ALLIANT COMPUTER SYS	7 3	6.125	0.9	16.7
Q	ALPHA MICROSYSTEMS	8 4	4.313	0.1	1.5
Q	ALTOS COMPUTER SYS	8 6	7.25	0.0	0.0
A	AMDAHL CORP	23 11	15.875	2.9	22.1
Q	APPLE COMPUTER INC	50 33	37.5	2.4	6.8
N	BOLT BERANEK & NEWMAN	11 6	7.625	1.0	15.1
N	COMPAQ COMPUTER CORP	113 61	84.75	6.3	8.0
Q	COMMODORE INTNL	20 7	10.375	0.1	1.2
Q	COMPUTER AUTOMATION INC	6 2	3.625	0.3	7.4
Q	CONTROL DATA CORP	24 16	17.75	0.4	2.2
N	CRAY RESH INC	66 31	41.625	3.0	7.8
Q	DAISY SYS CORP	7 0	0.688	-0.1	-8.3
N	DATA GEN CORP	20 12	12.25	-0.1	-1.0
N	DATAPoint CORP	6 3	3.75	0.4	11.1
Q	OELL COMPUTER CORP	11 5	5.5	-0.4	-6.4
N	DIGITAL EQUIP CORP	122 80	85.875	2.6	3.2
N	FLOATING POINT SYS INC	4 1	1.625	0.1	8.3
N	HARRIS CORP	40 26	34	1.1	3.4
N	HEWLETT PACKARD CO	62 40	48.5	2.5	5.4
N	HONEYWELL INC	92 60	87.125	0.4	0.4
N	IBM	131 93	98.875	4.1	4.4
Q	INFORMATION INTL INC	16 12	13.125	0.4	2.9
Q	IPL SYS INC	9 5	6	0.0	0.0
N	MAI BASIC FOUR INC	11 3	3	0.1	4.3
N	MATSUSHITA ELEC INO LTO	197 154	162.5	-3.5	-2.1
Q	MENTOR GRAPHICS CORP	22 13	17.125	-0.4	-2.1
N	NBI INC	3 0	0.375	0.1	33.5
N	NCR CORP	67 53	60.125	1.3	2.1
Q	PRIME COMPUTER INC	21 6	6.875	0.6	10.0
Q	PYRAMID TECHNOLOGY	21 9	20	1.8	9.6
Q	SEQUENT COMP SYS INC	21 9	20.25	0.3	1.3
Q	SHAREBASE CORP	4 0	0.313	0.1	25.2
Q	SILICON GRAPHICS CORP	29 14	29	0.8	2.7
Q	SUN MICROSYSTEM INC	23 13	18	1.4	8.3
Q	SYMBOLICS INC	3 1	1.375	0.2	15.7
N	TANOEM COMPUTERS INC	26 15	25.25	3.3	14.8
N	TANOY CORP	49 37	39.875	1.9	4.9
N	ULTIMATE CORP	12 7	8.625	0.4	4.5
N	UNISYS CORP	31 12	15.25	0.4	2.5
A	WANG LABS INC	11 5	5	-0.1	-2.4

## Software & DP Services

Q	AMERICAN MGMT SYS INC	19 11	12	0.9	7.9
Q	AMERICAN SOFTWARE INC	23 11	22.625	0.1	0.6
N	ANACOMP INC	8 4	4.625	0.3	5.7
Q	ANALYSTS INTL CORP	20 9	17	0.3	1.5
Q	ASHTON TATE	24 9	12.75	0.3	2.0
Q	ASK COMPUTER SYS INC	18 7	8.75	0.5	6.1
N	AUTO DATA PROCESSING	51 36	49.625	1.1	2.3
Q	AUTO DESK INC	44 27	41.25	2.8	7.1
Q	BMC SOFTWARE INC	33 14	32.625	4.1	14.5
N	BUSINESSLAND INC	15 8	8.25	-0.3	-2.9
Q	COGNOS INC	9 4	4.875	0.3	5.4
Q	COMPUTER ASSOC INTL INC	22 11	13	0.4	3.0
Q	COMPUTER HORIZONS CORP	11 7	9.125	0.5	5.8
N	COMPUTER SCIENCES CORP	59 46	57.25	-0.8	-1.3
N	COMPUTER TASK GROUP INC	16 9	9.25	0.3	2.8
Q	COMSHARE INC	42 21	37.5	4.3	12.8
Q	CORPORATE SOFTWARE	16 9	10	0.0	0.0
N	GENERAL MTRS (CLS E)	58 43	54.75	0.6	1.2
Q	HOGAN SYS INC	7 4	4	-0.1	-3.0
Q	INFORMIX CORP	16 8	16	1.3	8.5
Q	INTELLICORP INC	6 3	4.625	0.0	0.0
Q	LEGENT CORP	32 21	27.25	1.0	3.8
Q	LOTUS DEV CORP	34 18	31.75	2.3	7.6
Q	MANAGEMENT SCI AMER	19 8	18.25	0.0	0.0
Q	MICROSOFT CORP	90 46	89.25	3.0	3.5
Q	NATIONAL DATA CORP	35 23	34.25	3.3	10.5
N	ON LINE SOFTWARE INTL INC	10 5	10	1.1	12.7
Q	ORACLE SYS CORP	26 10	21.5	-1.8	-7.5
Q	PANSONIC SYS INC	19 12	17.125	0.6	3.8
Q	PHOENIX TECHNOLOGIES INC	19 3	4	0.3	6.7
Q	POLICY MGMT SYS CORP	38 22	35	1.5	4.5
Q	PROGRAMMING & SYS INC	22 16	22	1.0	4.8
Q	RELATIONAL TECH INC	16 5	7.875	1.0	14.5
N	REYNOLDS & REYNOLDS CO	34 23	24.125	0.0	0.0
Q	SAGE SOFTWARE INC	11 7	9.375	0.4	4.2
Q	SEI CORP	20 16	17.5	0.0	0.0
Q	SHARED MEO SYS CORP	19 12	13.125	0.4	2.9
Q	SOFTWARE PUBG CORP	21 10	16.75	0.4	2.3
A	STERLING SOFTWARE INC	9 5	9.125	0.4	4.3
Q	SUNGAR DATA SYS INC	25 13	24.375	1.4	6.0
Q	SYSTEMATICS INC	40 30	36.25	1.0	2.8
Q	SYSTEM CENTER INC	26 17	23.375	3.1	15.4
N	SYS. SOFT INC	31 17	30.75	1.5	5.1
Q	WOROSTAR	3 1	1.5	0.1	4.3

## Semiconductors

N	ADV MICRO DEVICES INC	11 7	8	0.1	1.6
N	ANALOG DEVICES INC	13 8	9.125	-0.3	-2.7
Q	ANALOGIC CORP	11 8	9.625	-0.1	-1.3
Q	CHIPS & TECHNOLOGIES INC	26 14	18	0.0	0.0
Q	INTEL CORP	36 23	35	1.0	2.9
Q	MICRON TECHNOLOGY INC	26 9	10.25	0.0	0.0
N	MOTOROLA INC	63 40	62.5	4.8	8.2
N	NATL SEMICONDUCTOR	10 6	7	0.4	5.7

N	TEXAS INSTRS INC	47 28	37	1.0	2.8
A	WESTERN DIGITAL CORP	15 6	9.125	0.9	10.6

## Peripherals

Q	ALLOY COMP	3 1	1.125	0.1	12.5
N	AM INTL INC	6 4	4.125	0.0	0.0
Q	AST RESH INC	11 7	11.125	0.9	8.5
Q	AUTO TROL TECH CORP	6 4	4	0.1	3.2
Q	BANCTEC INC	20 10	15.75	0.5	3.3
Q	CIPHER DATA PRODS INC	11 4	7	-0.1	-1.8
Q	COGNITRONICS CORP	8 2	6.125	0.1	2.1
Q	CONNOR PERIPHERALS	16 7	13.25	0.6	5.0
A	DATAPRODUCTS CORP	18 8	8.625	0.3	3.0
A	DATARAM CORP	12 7	9.625	0.0	0.0
N	EASTMAN KODAK CO	52 40	42.875	2.1	5.2
N	E M C CORP MASS	6 3	4	0.9	28.0
Q	EMULEX CORP	12 5	6.375	0.6	10.9
Q	EVANS & SUTHERLAND	25 15	23.75	0.5	2.2
Q	ICOT CORP	3 1	1.375	-0.1	-8.3
Q	INTERLEAF INC	10 5	6.875	0.0	0.0
Q	IOMEGA CORP	4 2	3.188	0.1	2.0
Q	LEE DATA CORP	4 1	1.563	0.2	13.7
Q	MASSTOR SYS CORP	4 2	2.313	0.1	5.7
Q	MAXTOR CORP	12 8	9	0.8	9.1
Q	MICROPOLIS CORP	9 3	3.625	0.4	11.5
Q	MINISCRIBE CORP	9 0	0.344	-0.1	-15.3
N	MINNESOTA MNG & MFG CO	82 61	81.375	1.8	2.2
Q	PERSONAL COMP PRODUCTS INC	6 4	3.938	0.1	1.6
Q	PRINTRONIX INC	10 7	9.875	0.0	0.0
N	QMS INC	13 7	12.375	0.9	7.6
Q	QUANTUM CORP	17 4	11.5	0.3	2.2
Q	RECOGNITION EQUIP INC	13 6	7.125	0.3	3.6
Q	REXON INC	8 6	7	-0.1	-1.8
Q	SEAGATE TECHNOLOGY	16 9	15.875	0.9	5.8
N	STORAGE TECH CORP	23 9	12	0.1	1.1
Q	TANDON CORP	1 0	0.813	0.1	8.4
Q	TEKTRONIX INC	24 16	18	0.4	2.1
Q	TELEVIDEO SYS INC	1 0	0.313	0.0	0.0
N	XEROX CORP	69 54	58.25	1.3	2.2

## Leasing Companies

Q	AMPLICON INC	115 10	11	0.3	2.3
N	CAPITAL ASSOC INTNL INC	9 4	4.5	0.6	16.1
N	COMDISCO INC	34 21	24.75	1.6	7.0
Q	CONTINENTAL INFO SYS	2 0	0.25	0.1	33.0
Q	LDI CORPORATION	18 12	15.75	1.0	6.8
Q	PHOENIX AMERN INC	5 3	3.625	0.3	7.4
Q	SELECTERM INC	9 5	6.25	0.0	0.0

EXCH:N=NEW YORK;A=AMERICAN;Q=NATIONAL

## A big bash

*High-tech firms begin the year with a big splash of optimism*

Could be the New Year, could be the New Decade, could be the New Peace — or maybe it's just that the new sport of '80s-bashing doesn't leave enough time or energy for the old sport of tech-bashing. Whatever the reason, the surging sense of optimism that powered an overall stock market rally in the early days of 1990 did not bypass the technology sector.

IBM stock rose 5½ points to a Thursday close of 100. Digital Equipment Corp. ended the week at 86¼, up 4¼. Motorola, Inc., up 4½ points, also garnered a share of the new enthusiasm for large computer companies; its stock closed at 62¾. Tandem Computers, Inc. logged a 3-point gain, closing at 26.

Apple Computer, Inc.'s announced stock buy-back inspired outside investors as well; Apple ended the week at 37½, a 2½-point gain. Thumbs up from a Wall Street firm sent investors scurrying for Compaq Computer Corp. stock, boosting it 1¼ points to a close of 86½. The qualms voiced by some analysts about the resignation of Microsoft Corp. President Jon Shirley (see story page 6) did not trouble investors: The microcomputer software giant jumped 4½ points to a new 52-week high of 91½.

Irony — which often appears to be Wall Street English for "life" — struck at the stock of Oracle Corp., which fell 1½ points in heavy trading after the company reported apparently impressive second-quarter figures. Oracle closed at 22½.

NELL MARGOLIS



## Pollution

FROM PAGE 1

the 1,522-member MWRA staff, water supply planning, capital management, maintenance management, procurement and materials management and human resources (see story this page).

The costs of the MWRA project are expected to quadruple the average residential water bill during the next 10 years — to an average of \$1,000 per year by the end of the century. However, despite the intense pressures on the MWRA to hold down costs, the agency has plunged into computerization in the belief that it will "significantly increase the Authority's ability to effectively manage the complexity of its capital programs," according to an IS department report.

The ability to put those tools in place is what lured F. J. Earley, 34, director of information technology, to the MWRA from a lucrative position as a partner at Nolan, Norton & Co. Earley's job, which he accepted a year ago, is to oversee the creation of expandable information systems while working under the public eye, a federal judge's court order and limited funds.

### Start at ground zero

"There is no other similarly exciting opportunity on the East Coast right now," Earley said. "Where else in the late '80s could you have the ability to start from ground zero?"

The MWRA was founded in 1985 by Massachusetts Gov. Michael Dukakis and the State Legislature. Forty-six communities get water through the MWRA, and 43 cities and towns use the wastewater services — in all, some 2.5 million people are served.

Because it must meet a rigid schedule of cleaning up the harbor set by the federal court, the MWRA has had to ramp up quickly. Missing deadlines in its aggressive timetable can mean fines of up to \$25,000 per day per project, said Paul Levy, executive director of the MWRA.

Earley and his systems staff of 44 have not been entirely without assistance in their efforts, though. Computer Sciences Corp. (CSC) was selected as the MWRA's primary contractor for a \$16 million contract. Under terms of the agreement, CSC will build a network and populate the data center with computers over a 26-month period, which will end in July 1991.

Through the CSC agreement, the hardware of choice has been Hewlett-Packard Co. computers: There are three HP 3000s and one HP 9000 for administrative computing, with HP net-

works between the remote computing sites and the data center. The MWRA also has a Digital Equipment Corp. VAX 6220 for scientific and engineering computing, which was obtained outside of the CSC contract.

When the CSC contract runs out next year, "we will be self-sufficient," Earley said.

"We are very sensitive preparing for our 1991 fiscal budgets," Earley said. "We have to be sure we are streamlined." He also added that while there is much political rhetoric surrounding the agency, "I have never heard anyone question the mission of the Authority."

As far as justifying systems expenses, Earley said he would have it no other way: "If I meet a ratepayer on the street who questions an expenditure, and I could not justify it, I would have no right being here."

In one of its most visible projects involving systems to date, the Authority located and repaired MWRA pipes leaking five million gallons of water per day en route to Boston from two reservoirs. The program also found 25 million gallons in leaks in 5,000 miles of community water pipes. The two-part project, wrapping up now, involved using telemetry equipment to track all water as it flows in and out of reservoirs and through pipes and aqueducts. Information systems are used to monitor the flow.

The second part of the project involves repairing and replacing water meters to provide reliable, frequent readings of the quantity of water being sold to member communities.

"It is important to reduce the water taken out of the Quabbin

[Reservoir] to safe yield," Earley said. "With the technology in place, we can track the accomplishments" while gaining important historical data.

The MWRA can now determine which lines are leaking, using the telemetry equipment, and then workers using sensitive microphones can walk along the route of the pipe to listen for leaks in underground mains. In a letter to MWRA board members last month, Levy said the water repairs, combined with educational programs and home water-saving devices, made 1989

**I**N ONE OF ITS most visible projects involving systems to date, the Authority located and repaired pipes leaking five million gallons of water per day.

the first year since 1969 that demand for water was less than the safe yield of the two reservoirs.

Perhaps the most ambitious project being undertaken by the Authority — the single largest public works project in New England's history — is the use of an Authority-furnished computer-aided design and drafting (CADD) system on DEC workstations to design the Deer Island wastewater treatment facility and projects associated with it. The plant will be a 500 million-gallon-per-day facility, located in Boston Harbor, that is slated to open by 1995 and be in full operation by 1999.

The wastewater project also involves designing a five-mile-long tunnel under Boston Harbor through which sewage will be

## Flow chart

**T**he 32 projects that fall under the guidance of F. J. Earley, director of information technology at the Massachusetts Water Resources Authority, are broken down into the following application modules:

- **Capital Program Management System.** Provides the capability to identify, monitor and report on planned and continuing engineering, construction, major maintenance and other related projects.
- **Operations Management System.** Assists in the operation of wastewater treatment plants, monitoring and reporting compliance with permits, checking the status of industries discharging into the sewer system and supporting efforts to monitor compliance with the Safe Water Drinking Act.
- **Maintenance Management System.** Assists in the management of currently maintained facilities, sewage collection and the water distribution system.
- **CADD and Geographic Information Systems.** Provides the Authority with the tools to begin the initial development and design of related functions and geographic based planning.
- **Procurement and Materials Management System.** Assists in managing contracts and controlling the purchases of goods and services.
- **Human Resource System.** Assists in maintaining, tracking and reporting human resource-related data. Payroll and position control processing and tracking fall into this category.
- **Financial Management System.** Provides the tools necessary to support the performance budgeting and performance monitoring approach so the public can evaluate the Authority's progress toward achieving its goals.

ALAN J. RYAN

pumped to Deer Island, and a seven- to eight-mile-long tunnel to be bored into bedrock to pump the treated water from Deer Island out into deep ocean water.

The system is called Boston Harbor Project CADD/Database (BHP CADD/DB). Using McDonnell-Douglas Systems Integration Co.'s Graphics Design System (GDS) CADD package and Oracle Corp.'s Oracle, the MWRA has designed eight custom applications that will be used by all contractors working on the Deer Island project for their architectural plans.

Using BHP CADD/DB, contracted design firms will produce the 3,000 architectural drawings involved in the Deer Island project, according to Kelly O'Day, senior design manager for CADD in the MWRA's Project Management Division. "We will have 200,000 shop drawings that will be generated during the construction phase on the Oracle database side," he added.

Earley's ongoing challenge, he said, will be to build a base of transaction processing in such a way that it is mindful of the future.

## Prize-winning utility's IS tripped up by big chill

BY CLINTON WILDER  
CW STAFF

MIAMI — Florida Power & Light Co. (FPL) is considered one of the nation's winners in the quest for corporate quality and even won Japan's coveted Deming Prize for quality last year [CW, Dec. 11, 1989]. On Christmas weekend, however, FPL and its vaunted information systems were defeated by an enemy named Jack Frost.

Record cold and frost zapped the Sunshine State Dec. 24-25 and sent electricity demand soaring to an all-time high — so high that FPL could not generate or buy enough power to meet it. The only option was to initiate a series of "rotating blackouts"

or 15- to 25-minute power cuts in various areas. That scenario rendered FPL's computerized system for responding to unplanned outages "completely obsolete," said Donald F. Borgschulte, director of systems and programming.

FPL's Trouble Call Management System (TCMS) was designed to quickly diagnose the cause of a power outage so that service crews could respond to restore service. However, the system cannot diagnose the cause when the power is deliberately cut off by the utility itself.

"The system is a model of our entire electric distribution system," Borgschulte said. "But we were changing that distribution system ourselves so fast that the



FPL's Borgschulte

computer model was wrong. The system never anticipates us turning a circuit off."

The blackouts affected 480,000 FPL customers on Christmas Eve and Christmas Day, knocking out heat, holiday lights and ovens cooking turkey dinners.

Another 60,000 customers

suffered outages because of equipment failure or damage — the type of problems diagnosed by the TCMS under normal circumstances.

The choices of where to cut power and when were made manually, not by computer. Florida utilities have extensive contingency plans for hurricanes but very little preparedness for sub-freezing temperatures, Borgschulte admitted.

FPL, whose quality-improvement program dramatically reduced customer complaints during the past five years, will now see a spike in its complaint-tracking graphs. The Florida Public Service Commission received 180 calls from FPL's customers between Dec. 26 (the first business day after the blackouts) and Jan. 2, commission spokeswoman Joey Kelly said. Although not all of those calls will be registered as official complaints, FPL had just 900 official complaints in all of 1988.



## NEWS SHORTS

### 3Com slashes bridge prices

Capitulating to new price competitiveness, 3Com Corp. cut prices on its entire family of internetwork bridges. The reductions will result in savings to users of 5% to 25%, depending on product and configuration. "3Com intends to lose no business in the internetwork bridge market, and our new pricing reflects that commitment," said Les Denend, vice-president of 3Com's Enterprise Systems Division.

### Pacific Bell's first ISDN site

The city of Fresno, Calif., signed a 10-year, \$2.9 million contract with Pacific Bell in that company's first implementation of an Integrated Services Digital Network. The new Centrex Integrated System converts a standard telephone line into a three-channel conduit for voice, data and video transmissions. It will be installed by the end of the month on 400 lines.

### DOT to buy 40,000 Windows

Microsoft Corp. is claiming its Windows products were the main reason the U.S. Department of Transportation awarded a major personal computer contract to AT&T. The department will purchase up to 40,000 AT&T PCs during the next eight years, all of which will feature Windows software from subcontractor Microsoft.

### Sysorex lands \$20M Mint deal

The U.S. Mint announced the award of an information systems facilities management contract, worth up to \$20 million, to Sysorex Information Systems, Inc., a systems integrator based in Falls Church, Va. The contract calls for enhancements to the U.S. Mint's Distributed Information Systems Network, which inventories and tracks the movement of currency through U.S. Mint facilities.

### ADP announces end to dirty hands

Tired of trying to read those smudgy, carbon-set W-2 earnings statements that your employer sends out each year? Automatic Data Processing, Inc. (ADP), the nation's largest payroll processing company, this year is mailing out a W-2 statement that is a standard-size, laser-printed form. ADP, based in Roseland, N.J., said the laser-printed W-2 was approved by the Internal Revenue Service last September.

### EDI services from Bell Atlantic

Bell Atlantic Corp. may soon become the first regional Bell holding company to offer electronic data interchange (EDI) services. Last month, the firm inked a four-year agreement with Atlanta-based Harbinger\*EDI Services to provide its own EDI software and transmission services. Bell Atlantic said it has plans to offer EDI capabilities to corporate and small business accounts in the mid-Atlantic states beginning early this year.

### DCA completes Cohesive sale

Digital Communications Associates, Inc. has completed the sale of its Cohesive Systems division to Racal Electronics PLC for approximately \$29 million, the two companies announced last week. Under the terms of the deal, which was announced last November, the purchase price may be increased by as much as \$20 million based on the T1 switch group's revenue during the next three years, beginning April 1.

### Tandy to peddle Netware

Not wanting to put all of its eggs in one networking basket, Tandy Corp. has added Novell, Inc.'s line of Netware products to its 3Com lineup. Tandy and its Radio Shack outlets are now selling entry-level, advanced and fault-tolerant versions of Netware. According to the company, Novell has also certified several Tandy PCs as suitable workstations and file servers.

## Microsoft OS/2 kit out the door

BY CHARLES VON SIMSON  
CW STAFF

REDMOND, Wash. — Microsoft Corp. last week began shipping the developer's tool kit for OS/2 Version 2.0, due in the second half of this year.

The tool kit paves the way for the 32-bit version of the operating system and promises to be the first thrust of the company's attempt to wean large numbers of users from 286-based machines and onto the high end of personal computer platforms.

"OS/2 was never meant to be on a low-end workstation, and the tool kits are the first concrete move toward getting beyond the limits of 16-bit, 286 machines," said Marshall Mosely, an OS/2 analyst at Dataquest, Inc. in San Jose, Calif.

The 32-bit version of OS/2 will provide several new capabilities. One of the most significant in terms of acceptance of the operating system is the ability to concurrently run multiple DOS applications unmodified on the same machine under OS/2. In the 16-bit version, DOS applica-

tions would run but would not allow multitasking. The latest version means that users can embrace multitasking without sacrificing developed DOS applications.

"That is a feature that we find interesting," said Roy Futterman, desktop network analyst at Merrill Lynch & Co. in New York. "Even on stand-alone platforms, it provides a capability that the 16-bit system can't deliver."

The tool kit will offer corporate and third-party developers a 32-bit C compiler and other development tools, as well as on-line technical support. The tools will facilitate the beginning of a suite of applications based on OS/2 Version 2.0.

The kit allows developers to pursue the following three development opportunities:

- Developers will be able to write conventional 16-bit OS/2 Version 1.2 applications that will run on the new system but will not take advantage of some advanced OS/2 2.0 features.
- The second option is to write applications that take full advan-

tage of OS/2 Version 2.0 but will not run on 286-based machines.

• The final option is to use a hybrid approach based on a function called conditional code that will run on either platform but will only show performance gains on a 386.

"The thrust is to create a stronger argument to move people onto the 386, where OS/2 really makes sense," Mosely said.

However, given the potential power, third-party OS/2 developers see little pent-up demand for the OS/2 Version 2.0 among corporate accounts, and most will wait to see some demand generated before they look closely at the tool kit.

"We just finished two large OS/2 installations in corporate environments, and so far, we haven't seen demand for the 32-bit version of OS/2," said Gregg Carse, president of CWA Communications, an OS/2 developer in Los Gatos, Calif. "We stay very close to our accounts, and as soon as we begin to feel a need, we will move toward Version 2.0."

## It's try, try again for Tandem Unix systems

BY J. A. SAVAGE  
CW STAFF

Tandem Computers, Inc. last week launched its second foray into the fault-tolerant Unix computer market. Although analysts doubted Tandem's commitment to open standards, the company vowed that it would succeed this time.

Tandem's line of computers has been based primarily on software fault tolerance in its own Guardian operating system. The new product, called Integrity S2, uses reduced instruction set computing architecture on three redundant CPUs from Mips Computer Systems, Inc.

Analysts said Tandem was driven to Unix in order to crack government markets and telecommunications companies, but it is not trying to replace its current proprietary line with open systems. Tandem, however, has gone to some length to provide interfaces so its proprietary systems are able to link to those with open standards.

According to Dataquest, Inc. analyst Rikki Kirzner, Tandem has been dragged kicking and screaming into open standards.

"They've been trying to avoid it all along. Their bread and butter is based on the proprietary system, but where they can't sell proprietary, they'll offer Unix," she said.

Tandem attempted to market a Unix computer from Altos Computer Systems, Inc. from 1986 to 1988. While Tandem did not call it fault-tolerant, it had built in some hardware and soft-



Tandem takes another crack at Unix

ware redundancy.

By all accounts, that effort failed badly due to lack of sales staffing and education. This time around, Tandem will have several distribution channels, such as Nixdorf Computer Corp., to assist in sales.

The first systems available will run at 12 million instructions per second (MIPS), but the architecture is designed to accom-

modate CPUs running at 1,000 MIPS at some undisclosed future date, said Jim Henry, manager of strategic support at Tandem's Microproducts Division.

The redundant architecture is based on three R2000 CPUs from Mips, a chip that has been available since mid-1987. The computers will not yet permit the use of newer chips, according to Henry.

### Three act as one

The three CPUs process the same data, acting like a single CPU, Henry said. There are three because if a piece of data is in question, the three CPUs will attempt to match it. If one CPU has data that does not agree with the others, it will shut down before it can contaminate main memory. This voting, which requires at least two of the processors to agree, occurs in less than 5% of runtime, he said. It also includes duplicate data paths to keep the computer from failing.

Unlike Tandem's other systems, the fault-tolerant mechanisms are built primarily into the hardware.

While there is some skepticism about the breadth of the market for fault-tolerant Unix computers, Tandem is not the only big company putting money into this area. Last week, Hewlett-Packard Co. said it will market fault-tolerant Unix machines from Sequoia Systems, Inc.



## TRENDS

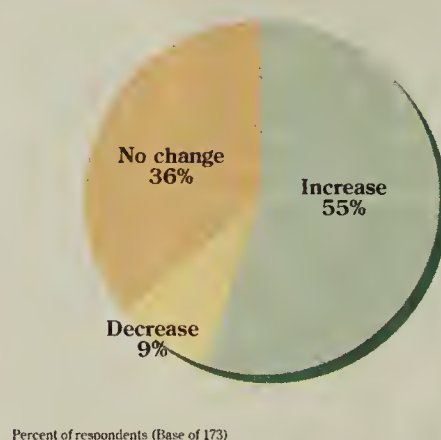
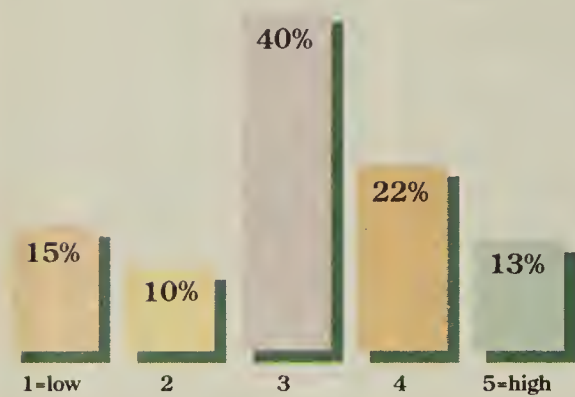


CASE Research Corp.'s annual CASE survey queried users at IBM mainframe and PCM sites on their success with systems development methods and how they see the use of such methods changing in the next year.

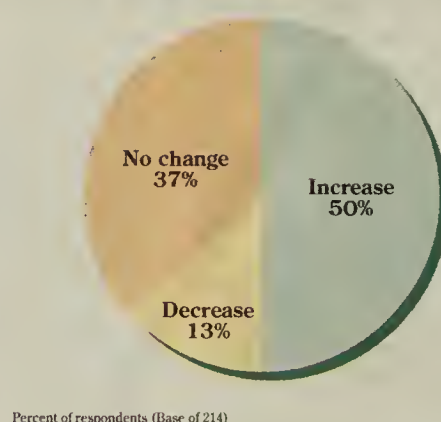
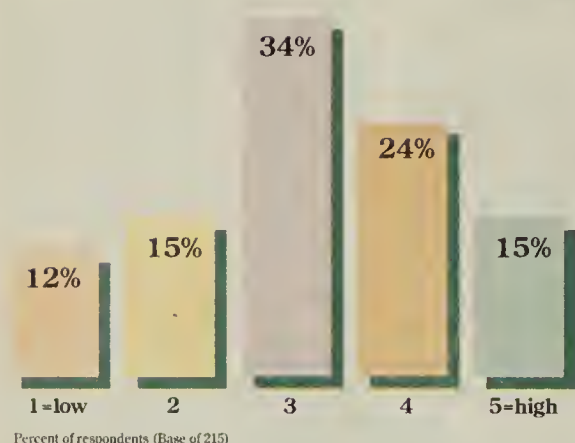
How would you rate your organization's view of the success of the following methods?

How do you expect the use of the following methods to change in the next year?

## Life-cycle methodology



## Primary structured method\*



Both methods appear to be meeting the expectations of their users, with the life-cycle method showing the most success.

\*Refers to front-end analysis and design methods

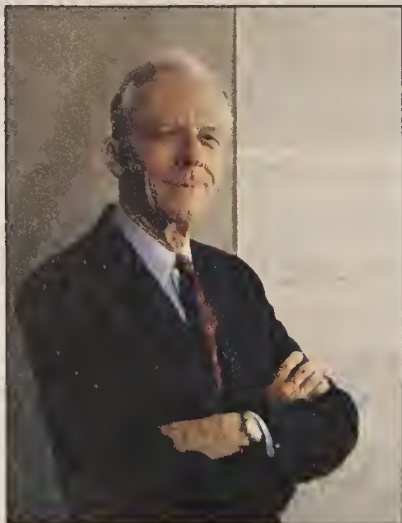
With success skewed to the high side, it is no wonder that at least half the users surveyed indicated that the use of system development methods will be increasing.

SOURCE: CASE RESEARCH CORP., BELLEVUE, WASH.

CW CHART: TOM MONAHAN

## NEXT WEEK

He was among the great pioneers in computing, inventing magnetic-core memory and leading the breakthrough Whirlwind computer project at MIT. And at the height of his technical fame, he gave it up for a 34-year teaching career. Meet the remarkable Jay W. Forrester in an interview in Manager's Journal.



DAVID LEIFER

You can't taste or see them, but information systems are becoming an integral part of the food production, marketing and delivery chain. To find out how computerization is affecting the contents of the American diet and the insights that grocers and food producers can glean from the contents of shopping carts, check out Executive Report.

## INSIDE LINES

## Point and click

Don't be surprised if Ingres (formerly Relational Technology) in Alameda, Calif., shows off a glitzy new user-friendly interface at Uniform '90 in Washington, D.C., later this month. The RDBMS vendor plans to roll out the DEC- and Unix-based product, code-named Sapphire, sometime this spring, sources close to the company said. Sapphire's supposed to stay under wraps until then — except for a hospitality-suite Uniform preview aimed at consultants and large user prospects. The new interface is intended for programmers who write Ingres-based applications, allowing them to "point-and-click" on icons that generate embedded SQL code.

## Aches and panes

Microsoft is gearing up to release the fabled Windows 3.0, eagerly awaited in part for its 640K-byte barrier-smashing feature, in March. And when it does, we'll see the end result of the hard lesson Microsoft has learned over the last two years: Don't even think of releasing a new environment without available applications to back it up.

Sources say that Microsoft will also unveil new versions of its own applications that will work with Windows 3.0, along with applications from the likes of Micrografx and neighbor Asymetric.

## Oh, lighten up!

Remember last January when Novell mightily ticked off DEC by announcing that DEC would support Netware 386? Well, DEC has since calmed down and is ready to make the same announcement on Wednesday. Sources tell us that DEC's Netware support will fall under its VAX for VMS Services and will include support for the Sun/Netware/Netwise remote procedure call (RPC) specification while Novell will provide support for DEC's RPCs.

## No room for bargaining

The unity discussions between AT&T and potential investors in its Unix Software Operation (USO) have slowed, according to informed sources. Not surprisingly, the snag concerns price. Apparently, AT&T believes USO is worth much more than investors are willing to pay.

## To live and die in L.A.

Word was out last week that IBM was planning to close its Los Angeles Scientific Center, one of three such research units in the U.S. An IBM spokesman said the L.A. center is still open and would not confirm nor deny if it was under consideration to be shut down. The autonomous scientific centers have been operating since 1964, and there are currently 17 worldwide.

## Photo finish

Kodak and DEC last week had reached the hammering-out-the-fine-print stage of their negotiations for DEC to provide, and probably run, Kodak's corporatewide communications system. The final signing is a good possibility for this week.

## Sibling rivalry

Months of acquisition negotiations between mainframe software player McCormack & Dodge and a privately held vendor of accounting software for the the IBM Application System/400 broke down last week, sources said. The reason: Management Science America, M&D's new corporate bed-fellow under parent Dun & Bradstreet, came up with another candidate, which also makes an AS/400 package. Customers shouldn't worry about the selection, but the same may not go for M&D President Frank Dodge, whose new-deal parity with MSA President John Imlay under D&B is left looking a little less equal than before.

*The week after Manuel Noriega turned himself in to the Vatican embassy, Abracadata began selling a computer game called "Find Noriega!" The chase takes players into CIA meetings, through the home of Jim and Tammy Faye Bakker and to Elvis' estate, where Noriega is disguised as the King. We hope it's a little easier to pass along your news tip to us. Just call News Editor Peter Bartolik at (800) 343-6474.*



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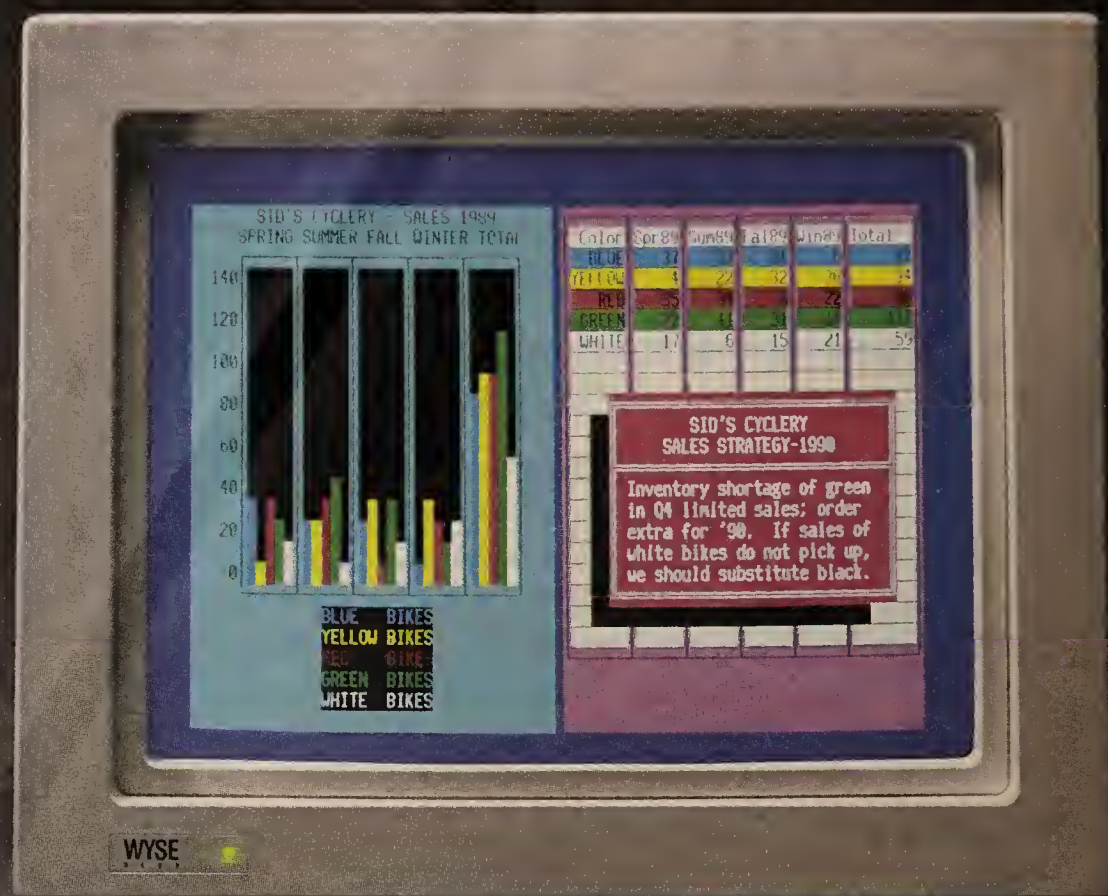
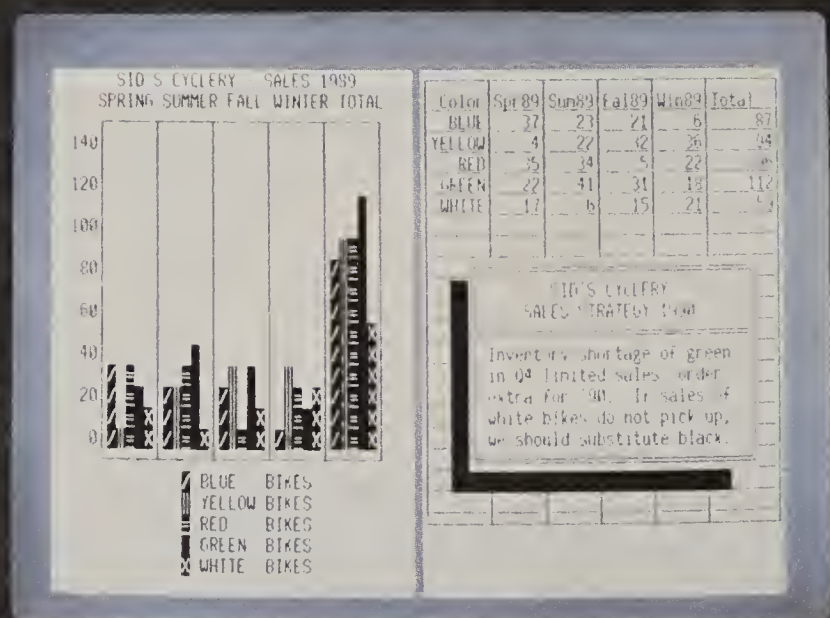
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